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REA AND ENERGY CONSERVATION

HEARING

BEFORE THE

SUBCOMMITTEE ON AGRICULTURAL CREDIT AND
RURAL ELECTRIFICATION

OF THE

COMMITTEE ON AGRICULTURE,
NUTRITION, AND FORESTRY

UNITED STATES SENATE

NINETY-SIXTH CONGRESS

SECOND SESSION

ON

ENERGY CONSERVATION AND ITS EFFECT ON RURAL
ELECTRIC COOPERATIVES

MAY 6, 1980

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REA AND ENERGY CONSERVATION

TUESDAY, MAY 6, 1980

U.S. SENATE,
SUBCOMMITTEE ON AGRICULTURAL CREDIT AND
RURAL ELECTRIFICATION OF THE
COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY,
Washington, D.C.

The subcommittee met at 9:40 a.m., in room 324, Russell Senate Office Building, Hon. Edward Zorinsky (chairman of the subcommittee) presiding.

Present: Senators Zorinsky, McGovern, Hayakawa, and Jepsen.
Also present: Senators Leahy, Boren, and Burdick.

STATEMENT OF HON. EDWARD ZORINSKY, A U.S. SENATOR FROM NEBRASKA

Senator ZORINSKY. The hearing of the Subcommittee on Agricultural Credit and Rural Electrification on energy conservation and its effect on rural electric cooperatives, will come to order.

I would like to read an opening statement after which we will call upon witnesses to testify.

The United States now imports 43 percent of its oil, or more than 8 million barrels a day.

In 1973, this Government initiated something called Project Independence, which was supposed to make us energy independent by 1980. But, in 1973, we only imported 36 percent of our oil.

I think it is fair to say that Project Independence was not a classic success.

It would appear that the most successful conservation tool developed thus far has been OPEC's price increases. Americans are driving less, and that is reducing demand.

But there is a lot more to energy conservation than cutting back on driving. Conservation is the first short-term step we must take to reduce our dependence on foreign oil.

President Carter has issued a set of nine conservation measures designed to cut U.S. oil use by 5 percent. Among these steps is the voluntary cooperation of utilities to make maximum use of excess generating capacity not fueled by oil.

Over the next 10 years, the President expects the utilities to cut their use of oil by 50 percent.

That could be a difficult goal to reach. At present, our electric utilities are generating a maximum of 540,000 megawatts, but in 20 years that demand is expected to be over a billion megawatts. That means that in addition to conversions from oil, a lot of new generating capacity must be developed.

What we will be telling our rural electric cooperatives is almost a violation of natural law. The co-ops have spent 40 years trying to stimulate development in rural America, thereby increasing consumption of electricity.

Now they have been put into the position of telling their owner-members not to buy their product. But that is the way it has to be.

The current situation leaves three questions in my mind:

First, what are REA and the cooperatives doing to encourage consumer conservation?

Second, will the co-ops be able to pay off their loans if they are successful in getting significant reductions in use?

And, finally, will the capital be available to finance the anticipated conversions to coal and other forms of generation.

America's agricultural plant is heavily dependent on oil-based products and energy of all kinds. The continued availability of plentiful food for America and the world at reasonable prices will depend, in great measure, on the performance of the rural co-ops and a number of agencies in the Department of Agriculture.

Some have criticized the REA for not taking the leadership role it ought to assume, and have said that the co-ops have not been getting the conservation job accomplished.

In 1977, the Department of Agriculture announced with a great flourish a home weatherization program whose goal was to weatherize 4 million rural homes. To date, fewer than 3,000 have been weatherized.

That effort seems more than somewhat puny.

For the past several decades, the Rural Electrification Administration and the rural electric co-ops have done a remarkable job in advancing the quality of life in rural America. They tackled a difficult job, and their success has been phenomenal.

Today, the REA and the co-ops face another tremendous task in adjusting to the current need for energy conservation. This morning, I am anxious to hear that this Government and their cooperators can bring to this new endeavor equal success.

Our first witness is Bob Feragen, Administrator of the Rural Electrification Administration.

Mr. Feragen, please have a seat.

Would you like to make an opening statement? If you have a lengthy statement, you might give us a summary of it.

STATEMENT OF HON. ROBERT W. FERAGEN, ADMINISTRATOR, RURAL ELECTRIFICATION ADMINISTRATION, U.S. DEPARTMENT OF AGRICULTURE

Mr. FERAGEN. Senator, I would like to do that. The statement has been made available to you. I will make a summary statement.

Senator ZORINSKY. Without objection, the entire statement will be placed in the record as if presented in full.¹

Mr. FERAGEN. Senator Zorinsky, I would like to say at the outset that the Rural Electrification Administration is exceedingly sensitive to the need for conservation. I think President Carter's conservation program and Secretary Bob Bergland's commitment that the agricultural agencies will include it as a high priority in our program's conservation goal, still keeping our eye on the major objec-

¹ See p. 37 for the prepared statement of Mr. Feragen.

tives of the program, has directed the effort of the Rural Electrification Administration.

I think we ought to be clear about what we mean by conservation and what the Rural Electrification Administration means by conservation. I do not believe that it means not using energy, but using energy wisely and at the same time, maintaining utility responsibility in rural America. Now, that is a very difficult balance of concerns. Every utility operator—many of them are in this room—realizes that probably the worst thing that can happen to them is having too much capacity on which they have to pay without getting a return from the consumer. Probably the worst part of that is not having enough and having a kind of social disruption, considering the uncertainty of the future. I am sure you will hear more about the problems of load predictions, since the institution of a conservation program is sensitive to that balance, and I would like to point out what the Rural Electrification Administration is doing to try to address it.

The objective was to get every co-op committed to the concept and to a corporate commitment to conservation. The Rural Electrification Administration set out to discover what were the most effective and the most workable rural conservation programs. Therefore, when we began in 1978 making the preliminary studies and meeting with the consumers, these questions were raised with the rural electric. In other words, the Rural Electrification Administration did not go ahead on its own, it consulted very carefully with the national association and with individual systems.

In January of 1979, we initiated REA Bulletin 20-2, which represented at least 12 months of prior development. During that time we worked with over 150 rural electric systems to develop a conservation policy. The recommended policy constitutes a commitment by resolution by the local cooperative board that the cooperative will make its best efforts to conserve and help its consumers conserve in their own operations and in their homes and businesses the use of electricity.

Also, the policy asked for a commitment of staff time. As a guideline, we suggested that they ought to have at least one individual committed full time to promoting conservation among the consumers in a system of roughly 4,000 members. A larger system would be some variation of that, not necessarily two people for an 8,000 member system, but an actual budgetary commitment.

I must say that I think that the response of the rural electric systems has been very good when you consider that when they started out, as the chairman suggested very clearly in the beginning, the job was to promote the use of electricity to change rural life. The reality is that we now have a very new problem. I think to shift their gears they have done a fine job. We got together with NRECA, and you will hear more from Robert Partridge about this, and we did a survey jointly that shows that out of the 734 systems that we surveyed, there is a commitment of over \$34 million to conservation by the cooperatives in this first 1980 budget figure. I think this is pretty magnificent considering this is really the first full year in which the conservation policy at REA has been enforced.

The systems indicate that more than 2 million employee hours will be devoted to energy conservation and they have begun training of over 800 persons on conservation and weatherization.

I am sorry to have to admit to the failure of the REA-Farmers Home Administration weatherization program. I think we did not achieve what we had hoped to achieve and what the Department had hoped to achieve. It is not a good record to say that we have only gotten \$1,300,000 of weatherization in rural homes. The figures show that it was not a good match, and I think there are a lot of reasons—the difficulty of rural electric co-ops dealing with credit worthiness, the credit test under the Farmers Home program, and the difficulty of the consumer dealing with two Federal agencies, albeit in the same Department.

It is for that reason that REA is proposing, and we hope to be able to have in force this summer, our new program for weatherization. It will utilize the development authority of section 12 of the Rural Electrification Act to permit REA to defer for 1 year the principal payment a co-op is to make, if they will, in turn, reuse those funds through their consumers for weatherization. We think that is the most cost effective, quickest possible way by which the Government can provide to the cooperatives, on a voluntary basis, the ability to provide the consumers with the wherewithal to make low-interest loans. These would not exceed 5 percent, and be used for the weatherization of their homes and businesses.

We have tried to keep the guidelines and forms to the absolute minimum simplicity. We think we have achieved that. We anticipate that after we have gone through the public comment period which ended on May 19, that we will be able to move forward with this program. I think we have had enthusiastic responses. We certainly did from the national association. They passed resolutions supporting it.

There is another area that I believe that rural electric systems can address—development of what I call emerging technology, or technology alternatives to the use of oil. That is a critical situation, and although REA borrowers do not have a great number of plants using oil, there are some. With the growing additions of capacity, we see the additions of coal and nuclear capacity as being absolutely necessary to the future of meaningful load growth. We also see an opportunity for the cooperatives to add some capacity in what is sometimes called alternative or, more appropriately, renewable energy resources.

To address that, we have adopted and intend to go ahead, once we have received final approval of the terms on which we will do this. We have adopted a policy to exert the authority of the Administrator to make what is sometimes referred to as front end loans. We have never done that prior to this time. We are prepared to make low-interest, 5-percent loans to the cooperatives for the study of feasibility and the licensing of these plants, and we hope in this way to encourage this. We have identified over 150 hydroelectric projects that have the possibility of development and with the availability of low-interest funds for the study portion, they will be encouraged to do that.

The chairman spoke of the difficulty of the future, the uncertainty of load growth, and I would like to address that point.

We had, as part of our testimony, statistics from 1979 energy sales by REA's. They illustrate the difficulty which the co-ops face in making precise predictions about future capacity needs. As the committee knows, the REA's have grown at a faster rate than the urban utilities. As a matter of fact, the growth rates in the past year have been in the 8 percent or 9 percent annual load growth, and the energy growth in the year previous, that is for the period 1978, was at 6.3 percent over the previous year. So it is rather remarkable statistically to discover energy sales in 1979 were only 3.1 percent higher. I hasten to say immediately that REA has not drawn a conclusion that energy conservation, certainly not REA's program, is the cause for that. It is the result of a multitude of causes. Certainly the weather patterns in the United States, both North and South, both the heating load and the air-conditioning load had something to do with it.

In addition, the price elasticity, the fact that the increased cost of energy has made people extraordinarily conscious of the use of energy, has dramatically reduced the energy consumption in rural America.

It is interesting to note that the average use of electricity per consumer was even lower. In other words, consumers used 1.9 percent less than in 1978. The fact that there was a growth of 3 percent is because of the number of consumers added to consumer lines—over 300,000 last year.

The point we need to focus on though is that the Rural Electrification Administration and the borrowers have taken, and are in the process of taking, special effort to deal with future load projections and REA is engaged in two studies to address that subject. I have no faith that we are suddenly going to have a crystal ball in which we will have absolutely accurate figures. But I think what we are sensitive to is that we must meet the growing loads of rural America. We must be certain however, that we do not have large assessments of capacity at very high cost. My testimony goes through an exercise of what some of the savings are, not only to the system, but to individuals.

I am convinced in conclusion, Mr. Chairman, that the rural electric system can and will be responsive. I think they have been responsive on energy conservation. It is a change from the promotion of electric energy to one that looks carefully at the wise use of energy. I think, too, that they will show themselves able and willing to develop those emerging small technologies of utility size in order to add increments of nonoil type capacity. And I believe that in the last 2 years, REA has made, and is in the process of making, these tools available to help the rural systems meet those objectives.

One last word. We have made it clear that to face that dilemma, for those systems that might, through conservation by their consumer members, have cash flow difficulties, we are prepared to use section 12 development to get them over any rough economic period. We are not going to let the rural electric system on the one hand fulfill conservation imposed by REA policy, and let them sit there and dangle with economic distress if they do a good job. We have the tools to get across this dilemma and, in the long term, we will continue to strengthen the rural electric system.

Thank you.

Senator ZORINSKY. My colleague from Iowa, Senator Roger Jepsen, has joined us.

Senator JEPSSEN, are there any questions you would like to ask?

Senator JEPSSEN. I am interested in this home weatherization program. You feel that the correct way of getting this moving is to offer a forgiveness or postpone repayment of loans? Can you talk a little bit about that? Three years ago, Senator Zorinsky indicated, that the Department of Agriculture initiated this with considerable publicity and great courage. What has happened? How much money has been spent? What do you intend to do? Elaborate on that, if you would.

Mr. FERAGEN. Senator, I indicated that Secretary Mercure and I got together with Gordon Cavanaugh of Farmers Home Administration in reviewing that program. We were really disappointed to find that only \$1,300,000 was actually lent for home weatherization. That certainly is a bad showing. The reason why, had to do with the complexity of the Farmers Home program. Dealing with the two agencies was more than the consumer really wanted to face. Perhaps, too, the perceived need for weatherization may have been somewhat less than it is today. Whatever the reasons, in working on it our staff, with the help, I might say—and I give due credit to the Assistant Administrator who has been with REA for 30 years and understands the program thoroughly—developed the concept that deferred payment ought not to be used except for high national purpose when the local co-op needs that special help. For that reason, we made a calculation that savings through deferred capacity by weatherization not only benefit the electric system in the long run because they defer high-cost investment in capacity, but there also is an immediate benefit to the consumer. We sought to devise a quick effective way of giving the co-ops the tool to do that.

The plan is that on each quarter the co-op can elect to defer all or part of the payment due REA on the principal for 1 year. Then, under policies developed by the local board under general guidelines from REA, relend that to the consumers for the specific purpose of weatherization.

We considered the problem of whether to include machinery, for example, like heat pumps and fuel furnaces, and elected not to expand the program to those items for a number of reasons, which we can go into if you wish, but to stick very closely to weatherization. That is the most immediate and effective thing to be done.

In terms of cost effectiveness, it means that the REA will have to add no additional individuals; we seek no additional authority from the Congress. All we must do is make an entry in our bookkeeping system that accounts for this deferral. And it is my feeling, Senator, that in that manner there is a potential of delivering literally up to tens of millions of dollars, even \$100 million to the extent that the REA systems are willing and able to use that deferment. It adds some cost to the Government because of the revolving fund. In terms of the capacity, it is a miniscule fund and our figures point that out in the testimony, Senator Jepsen.

Senator JEPSSEN. Have you discussed this with the individual State Departments of Environmental Quality, for example, in Iowa,

the Environmental Protection Agency? Did you discuss the Air Quality Control Acts and rules with regard to converting to coal?

Mr. FERAGEN. We have a good knowledge of the States' regulations, of course, as well as the Federal, and all new programs must get the permits that are required by State and Federal regulations. We do have an environmental section that goes through the permitting process with the borrowers, and we are aware of the cost of those and the time it takes to do them. But our obligation is, of course, to obey the State and Federal regulations with respect to making loans.

Senator JEPSEN. Do you feel there is a need to look at these to bring them more in balance to facilitate this thing called "transfer to coal"?

Mr. FERAGEN. Yes, sir, I certainly do. I think very often of what the Senator and chairman are well aware of. Very often the laws that are passed and distributed end up in the kind of restrictive regulations that were not intended, and I certainly think the Congress ought to look very carefully at the cost of the requirements placed on entities, not to go back in time. I think it is a matter of calibrating these requirements to the point where we are getting cost effectiveness from them.

I would agree with the implications of the Senator's remarks that some of it has not been cost effective.

Senator JEPSEN. What I am hoping is that as part of the administration—you would, if you have not already, put in an order and put in writing these recommendations that you have. Further, by way of feedback from all the REA's around the country who are interested in conservation, as all our energy people are in this country, and by joining hands with those in the private sector to try to bring some reality into this. We can get about the job of doing what we believe needs to be done. And that is conversion to a number of these things in the coal burning area.

In Iowa we have a 300-year's supply of coal. Yet we cannot use it. It just simply does not make any sense.

Mr. FERAGEN. I understand what you are saying, Senator, and one thing a country boy from South Dakota learned in coming down to the Federal Government is there are all kinds of levels of negotiations, and I think the REA Administrator has been involved in that. I have had experience in generating fuel in the past and I understand the problems they face.

When the regulations are made and the laws are made, then it is my obligation to see that they are carried out. I understand what you are saying and I sympathize with that concern.

Senator JEPSEN. I am taking this opportunity to ask for your help and if you would put your recommendations forward.

Mr. Chairman, may he submit those to the committee?

Senator ZORINSKY. Without objection, the record will be kept open for the inclusion of your recommendations.

Mr. FERAGEN. Yes, I think we could do that by addressing some of the things we discussed with the Council on Environmental Quality on that matter.

Senator JEPSEN. I would like to have your recommendations on that.

Mr. FERAGEN. We will comply.¹

Senator ZORINSKY. My colleague from North Dakota, Senator Quentin Burdick is here.

Do you have any statement to make or comments?

Senator BURDICK. Just simply that it is a pleasure to welcome the administrator to the Hill. I am just going over his statement. I have been to two or three places this morning.

I want to thank you, Mr. Feragen, for coming here and I will go over your statement very carefully.

Senator ZORINSKY. Thank you, Senator Burdick.

Senator Patrick Leahy from Vermont is also here.

Do you have any questions to ask Mr. Feragen or any statement or comments to make?

Senator LEAHY. Simply, Mr. Chairman, that I am interested in the whole area of weatherization and what that might do in saving energy and what it might do to help people, especially in rural areas, and I have held some hearings of the Rural Development Subcommittee on this. I have a bill that I back, the Rural Areas and Small Cities Energy Savings Act of 1980, S. 2658, which would go into this. I would ask that a copy of this legislation and my introductory statement on it be printed in an appropriate place in the hearing record.²

I understand that since 1977, the USDA has had a weatherization program, and I understand in those 3 years, only 1,300 homes have been insulated.

Senator ZORINSKY. Senator Leahy, prior to your arrival, Mr. Feragen admitted failure of that program. I just wanted you to be aware of that.

Senator LEAHY. I just mentioned that because that is my primary purpose for being here, not to in any way embarrass Mr. Feragen or his agency. I have very high respect for him and the agency. I just wanted people to know exactly how I feel.

I do not think proposals for loan development or leveling on-peak consumption periods will be an automatic answer. I am not sure how much energy they are going to save. I would hope that some consideration is given to how co-ops or whether co-ops that participate in the weatherization program could be reimbursed for administrative costs—7 percent of the grants they have administered.

I have sent a letter to the REA the first of April regarding deferment of loan payments. If I can get some response to that, I would have some questions for the record as a result. But the whole point, Mr. Chairman, is that we in rural areas and small communities desperately need a good weatherization program, not just in an area like Vermont where we have 10 months of winter and 2 months of poor sledding, but just about anywhere else. Your State certainly has wild weather.

Senator ZORINSKY. We are not a stranger to that type of weather.

Senator LEAHY. Senator Burdick tells me North Dakota is not mistaken for Palm Beach during January and February.

Mr. FERAGEN. It was this year.

Senator LEAHY. Usually those people in rural areas are in older homes and usually they do not have the money to do the type of

¹ See p. 13.

² See p. 45 for the introductory statement and reprint of S. 2658 referred to by Senator Leahy.

weatherization needed or certainly make a huge payment to do it, and yet a fair amount of our energy is going there and we have got to take substantially more steps. I will back the Department in ways to do it, but it has to be a major internal priority.

Thank you.

Senator ZORINSKY. Senator Burdick.

Senator BURDICK. I approve the statement. I would like to ask the Administrator just one short question.

On page 6, you say:

REA's announced intention to use section 12 for home weatherization in the intention to finance feasibility studies of low-head hydro projects were met with very enthusiastic responses by the delegates to the recent National Rural Electric Cooperative Association meeting in New Orleans.

Do you have any jurisdictional difficulties with the Department of Energy or with the Interior Department on these studies?

Mr. FERAGEN. No, Senator, I do not believe we have.

Senator BURDICK. You have marked out some territories where each will operate. How are you going to work it?

Mr. FERAGEN. The short of it is we have talked with the Department of Energy and also in the Department of Agriculture regarding municipal systems interested in studying and developing low-head hydro utilizing the Farmers Home loan authority. The Rural Electrification Act does not permit me to make a loan to the rural electric systems that are already being served.

We are developing an agreement by which the Department of Energy front-end funds, which are $7\frac{1}{2}$ percent loan funds, are forgivable if the project is not feasible. We will couple that with an REA initiative making a front-end loan under the authority the Administrator has. The reason for coupling those is that most feasibility studies of any dam of any consequence are likely to exceed the \$50,000 or even \$100,000 that the Department of Energy is making available.

We feel that by bringing these together that the cooperative could elect to study a hydro project, get the maximum amount of funds available from the Department of Energy which might be forgivable if the project did not go forward. That would diminish the amount of money they would be borrowing from the REA at 5 percent for that purpose. Then we stand to make a loan guarantee very likely for the project once it proves feasible.

I think that agreement is coming together pretty well because the Department of Energy recognizes that the number of dams available for development is very large, and I think their budget this year is \$10 million. This really does not provide an awful lot of funds and, therefore, by coupling them, we can mount a much better program. I look enthusiastically upon that developing.

Senator BURDICK. The reason I asked the question is ordinarily feasibility studies are conducted by the Corps of Engineers or the Bureau of Reclamation. I wondered if you had the staff and expertise in this area.

Mr. FERAGEN. We are looking fairly closely at small dams. We are dealing with FERC with respect to fast track licensing, with the fast track licensing process, which they tell us they have in place and ready to go. With the Corps of Engineers, it is our fervent hope that they will look to full cooperation in developing

these because they have authority over navigable streams which includes almost everything as you know. I have no other comment to make.

Our preliminary talks with them have been positive. I hope that continues.

Senator BURDICK. Thank you.

Mr. FERAGEN. I would like to respond to Senator Leahy's question.

Senator ZORINSKY. Yes, go ahead.

Mr. FERAGEN. Your hearings inspired, certainly, concern for the question of the reimbursement of the cooperative. We had to make a decision in dealing with section 12 of how open or how arbitrary REA ought to be, and balance that between the desire that I have that we remove regulations and restrictions upon the co-ops.

In fact, I could expound on that subject for awhile but I will not. I think we are making some real progress in reducing the number of bulletins and freeing up some regulations. In section 12 deferments, we will leave it up to the local co-op to determine what they charge. Most of the deferment will be on the 2-percent loans. It would be payment of the older loans which would be deferred first. They can elect to either absorb all the cost and then if the local board decided to make a loan at no interest, we would have no objection to that. They can also elect to make a loan at 5 percent. We believe that the differential between the 2 and 5 percent and the fact that they will be getting payments on that loan immediately after installation, will provide them with the revenue that will reimburse the cost of administering the program and should provide some funds for a reserve fund covering losses. So I think that deferment plan and guidelines we have outlined give them tools to do what we suggest.

Senator LEAHY. The final proof will still be the numbers?

Mr. FERAGEN. Yes.

Senator LEAHY. That is what we will look for?

Mr. FERAGEN. Yes.

Senator LEAHY. I will back efforts that will increase the numbers out there because it is vitally, vitally important in rural areas, and it is something that has to be approached now. For most of the country, this is the best season of the year to be doing that. Construction costs will be less. I suspect that there is a fairly large labor pool out there with the problems in the housing industry, and it is a good time to get involved in it.

Mr. FERAGEN. We will make every effort to encourage the co-ops to do it. We left it as a voluntary program. I thoroughly agree with you as to the need.

Senator ZORINSKY. Mr. Feragen, with regard to those co-ops that do not generate their own power and have few customers per square mile, what are the kinds of financial problems they are facing? And are there disincentives for them to get involved in the problem of conserving energy?

Mr. FERAGEN. Yes, certainly. Every co-op has to face the problem of cash flow. To the extent the sales of energy are reduced, their revenue is reduced. When the co-ops have come to me and said that I do not need to promote it any more, it is happening naturally, when I have had only 1 percent growth or no growth. I asked them

if they had a cash flow problem, or if they were in trouble, and the answer I got was that they did not have a problem that has gotten to that point.

All of us are aware of the concern that many consumers have about the rising cost of energy and even the disruptive effect that has had on the cooperative scheme of providing rural electrification. We have prided ourselves in the past on being very close to the consumer. It is a consumer-oriented industry. It is in the best interests of the long-term security of the cooperative to deal very openly and very forthrightly with their consumers and help them conserve and, therefore, reduce their monthly bills. That is consistent with the national objectives.

To the extent that they are not a generator, it seems to me that many co-ops, when they are under wholesale contracts, can, with the application of load controlling devices, reduce the costs. Sometimes this depends upon the details of their wholesale power contracts, but they can, with a studied direction, reduce the cost that they have to pay to their supplier and, in this way, reduce some of the expenses against which those revenues have to be placed.

Senator ZORINSKY. The Cajun Electric Cooperative which serves east Texas and parts of Louisiana is preparing to enter a joint venture with an investor-owned utility to build a generating plant. A Beaumont, Tex., newspaper reports that this plant will generate more power than the cooperative will need for some time to come, yet the construction costs will sharply escalate power bills to the members.

Why should REA be financing this type of project? Would it be fair to say that REA loans are being used to bail out investor-owned utilities?

Mr. FERAGEN. Let me answer the last question first, Senator.

I do not think REA loans are bailing out private utilities. I have been particularly sensitive to that because I think the strength of the rural electric program is that we make a strong rural electric system. I can tell this committee that I have sent back to the negotiating table at least three G and T's who were ready to make contract before they had achieved what I thought were ownership rights in their joint ownership arrangements with a private utility.

On the other hand, in the current situation, and with current conditions in America for energy, the failure to cooperate with other utilities and to share capacity through joint ownership impairs both rural electrics and private utilities. Therefore, to give up that opportunity would be very unwise on the part of the utilities themselves.

As to the accusation in the newspaper, I suppose the only thing about it is that it is not unique. We have newspaper articles, and newspaper editors and writers that sometimes take it upon themselves to conduct feasibility studies in their columns. REA is very sensitive to the question of feasibility. My obligation is to see that these systems are able to pay back very large loans, and I have faith in the REA staff for being responsive to that objective. We will provide for the committee any detail that the committee might like upon that particular instance.

We do not want to see a rural electric co-op, as I said earlier, have excessive amounts of capacity that they have to carry through the years.

Senator ZORINSKY. You have projections on that particular plant?

Mr. FERAGEN. Yes, sir.

Senator ZORINSKY. On future needs?

Mr. FERAGEN. Yes.

Senator ZORINSKY. They do not agree with what was published in the paper?

Mr. FERAGEN. The accusation was so broad that I think it would be hard to respond to specifically, but I would be glad to make available for the record, our record on it, and I will do that, Senator.*

Senator ZORINSKY. Thank you. I would appreciate that.

In some States the electric rates of cooperatives are not regulated, while the rates of the investor-owned utilities are.

In the States where this is the case, what is the difference in the rates between the cooperatives and the investor-owned utilities?

Mr. FERAGEN. It is such a mixed picture, I would like to provide for the record perhaps a summary analysis of the great differentials between the rural electric systems and the private utilities. There is a cycling of new capacity because of the lower growth. Also, because of the greater amount of capacity that private utilities have along with lower embedded costs, they have not been faced with the problem of rural electrics who in 1973, with the understanding and wisdom of Congress, got a brand new loan program which put them on the guaranteed loan rates. As a consequence, the interest costs, and I expect you would probably hear about that today, for cooperatives is substantial compared to low-embedded cost, so there is a substantial rate differential.

In many cases when the new capacity of private utilities comes on line, they will be faced with new costs and their rates will go up too. I can think of one case specifically where this kind of a controversy is raging in Florida, and the whole thing is on differential of rates. Halfway through, the private utilities had to have a rate increase, and they jumped above those of the rural electrics.

It is not a clear-cut or cookie cutter kind of operation. We would be glad to provide to the committee a summary of those differentials, and now we account for them.*

Senator ZORINSKY. President Carter and the two budget committees of Congress proposed to establish a credit budget, and they plan to put on budget those credit programs which are not presently counted against the budget.

How will this affect rural electric and telephone programs which are not currently on budget?

Mr. FERAGEN. Senator, I think that having a credit program on budget could work very well if the Congress and the administration in general had a good understanding of the needs of rural America for electric power. I think that the guarantee program, and insured budget program has worked very well with Congress dealing on an early basis with the levels of the ranges of authority for the REA Administrator to work on.

*See p. 16.

I found that, in my short period as an administrator, to be very workable. It deals realistically with the way in which the G and T loans come down the pike, they are not on an annual kind of basis, the way distribution loans are, but I could live with an on-budget kind of program if it recognized true needs, and did not depress utilization of the loan programs artificially.

Senator ZORINSKY. My colleague from South Dakota, George McGovern.

Senator MCGOVERN. Mr. Chairman, I know the Administrator has been on since about 9:30 this morning, so I think I will just express my appreciation for the work he has done in his testimony today, and I will defer my questions until later.

Senator ZORINSKY. Senator Hayakawa?

Senator HAYAKAWA. Thank you. I am happy to be here.

I have been listening to problems of the automobile industry, and I have to shift gears to understand what you are saying.

Mr. FERAGEN. I am glad to be in this business, and not the automobile business.

Senator ZORINSKY. Mr. Feragen, in the interest of time, I would like to submit the balance of my questions to you in writing. We will keep the record open so you can answer them, and some of the questions that my colleagues have.

Mr. FERAGEN. Thank you.

[The following information was subsequently submitted by Mr. Feragen:]

Hon. EDWARD ZORINSKY,
Committee on Agriculture, Nutrition, and Forestry,
U.S. Senate, Washington, D.C.

DEAR SENATOR ZORINSKY: On May 6, 1980, the Senate Subcommittee on Agricultural Credit and Rural Electrification conducted a hearing on the Rural Electrification Administration's (REA) energy conservation efforts. During my testimony members of the subcommittee raised a number of questions for which I stated that the REA would provide additional material.

The enclosed information is supplied in fulfillment of that pledge. It does not reflect U.S. Department of Agriculture or Administration policy, nor is it to be considered a recommendation by REA for specific statutory or regulatory changes. This information is being offered to the Subcommittee as types of regulatory considerations Congress might review.

The Rural Electrification Administration hopes that the enclosed material will be of use to the Subcommittee on Agricultural Credit and Rural Electrification.

We would welcome any further opportunity to be of assistance.

Sincerely,

ROBERT W. FERAGEN, *Administrator.*

Enclosure.

RESPONSE TO QUESTIONS FROM THE SUBCOMMITTEE ON AGRICULTURAL CREDIT AND RURAL ELECTRIFICATION ON MAY 6, 1980

I. Senator Roger Jepsen requested the Rural Electrification Administration to provide information concerning potential actions that would encourage use of coal as the fuel source for electric generating facilities. The following information does not reflect Rural Electrification Administration, U.S. Department of Agriculture or Administration policy.

In REA's view, there are three distinct categories of problems and associated potential actions that directly affect the level of coal use for electric generation: (1) Environmental statutes and regulations that affect coal. (2) environmental statutes and regulations which inhibit planning and construction of central station power facilities and (3) programs to increase the demand for coal as an energy source vis-a-vis coal and natural gas. There are certain existing and proposed environmental laws and regulations that particularly affect coal-fired generating stations.

A. Problem.—U.S. Environmental Protection Agency (EPA) draft regulations implementing § 169A (Visibility Protection for Federal Class I Areas) of the Clean Air Act take a very broad view of what values Congress intended to protect. The draft regulations give Federal Land Managers great discretion to designate and protect vistas lying outside Class I areas.

In addition, certain onerous provisions apply only to large (750 megawatts or greater) fossil-fuel electric generating plants. If adopted in final form as proposed, several existing coal-fired facilities will need to retrofit added control equipment at significant cost. The difficulty in mitigating emissions and siting will make new coal-fired plants facilities less attractive when compared to other alternatives. It is also likely that the proposed regulations will hinder, perhaps seriously, the synthetic fuels program enacted by Congress in the form of the Energy Security Act. We are faced with a situation where Congress has mandated development of synthetic fuels and greater use of coal for electric power generation (Fuel Use Act), and yet the EPA may frustrate this purpose by an expansive misinterpretation of Congress's intent in enacting § 169A.

Potential action.—Amend § 169A of the Clean Air Act to make clear that the visual integrity of vistas outside Class I areas, that can be seen from within, will only be protected if the view of those vistas was an underlying reason that Congress created the subject national parks, wildernesses, etc. In addition, declare that no category of emissions source shall be subject to special, unique regulatory provisions unless good cause is demonstrated.

B. Problem.—§ 714 of the Surface Mining Control and Reclamation Act of 1977 requires the consent of a "surface rights owner" before the U.S. Department of Interior (USDI) can lease Federal lands for coal mining and allow commencement of operations. USDI is directed to avoid surface mining leases for large tracts to the maximum extent practicable where a significant number of surface rights owners object. These provisions may foreclose extraction of extensive coal deposits or lead to inefficient mining practices by forcing the mining operator to avoid a patch quilt of nonconsenting surface rights owners or engage in underground mining. There is a shortage of very experienced underground miners in these areas.

Potential action.—Delete § 714 and replace it with language that permits USDI coal leases without the consent of surface rights owners so long as the mining lease adequately compensates each surface rights owner for reduction in the value of those rights and lost income.

C. Problem.—Coal fired generating plants generate SO₂ and NO_x. Many authorities have suggested these gases are significant factors in producing acid rain. Some studies indicate acid rain has detrimental environmental impacts. Congress has recognized the issue and mandated a ten year study to identify the causes and effects of acid precipitation and actions to limit or ameliorate harmful effects. On the basis of very fragmentary information, some agencies and interest groups already have indicated that acid rain is a universal problem and corrective action should be taken. Uncertainty as to what may eventually be required for emissions control may dissuade utilities from using coal as a fuel source. In addition, synthetic fuel facilities now in the planning and construction phases may generate these gases when in operation. Unless an unbiased study is conducted, coal-fired generating facilities and synthetic fuel plants will be unjustly penalized (frustrating national policy to encourage coal use and synthetic fuels) or rewarded.

Potential action.—Amend Title VII, Subtitle A of the Energy Security Act. § 703(a) lists the members of the Acid Precipitation Task Force. They include several agencies which may have a strong institutional bias for or against finding that acid rain is a significant problem. Scientifically rather than administratively oriented agencies are least likely to prejudice the evidence and most likely to reach objective conclusions. We suggest reconstituting and limiting the membership to the National Oceanic and Atmospheric Administration (chairman), National Aeronautics and Space Administration, National Science Foundation and the four National Laboratories mentioned in § 703(a)(2). In addition amend § 705(b) to indicate that emission and national ambient air quality standards for SO₂ and NO_x may not be made more stringent on the basis of acid rain effects unless specifically authorized by Congress.

D. Problem.—A number of parties have raised the issue that the residual material from combustion of coal (ash) and air emissions may contain sufficiently concentrated amounts of certain trace elements to be considered as a hazardous waste. This unresolved issue raises uncertainty among electric utilities and will probably also be an issue for the waste generated by synthetic fuel facilities.

Potential action.—Enact legislation similar to Title VII, Subtitle A of the Energy Security Act to study the potential hazards or lack thereof of trace elements in coal. The task force conducting the study should be similar to that given in C above. The

legislation should state that no action shall be taken by an agency to declare coal ash a hazardous waste without specific Congressional authorization.

E. Problem.—Often coal suitable for surface mining lies beneath prime and other important farmland. U.S. Department of Agriculture policy requires its component agencies to assure that such lands are not irreversibly converted to other uses unless other national interests override the importance of preservation or otherwise outweigh the environmental benefits derived from their protection. The Council of Environmental Quality suggests that all Federal agencies be sensitive to the value of prime farmland. Such policies discourage use of large quantities of coal.

Potential action.—Enact legislation to indicate important farmland can be surface mined if there is no practicable alternative and if mitigation measures prescribed by the U.S. Soil Conservation Service and Office of Surface Mining, USDI are utilized. Where a mining operation can demonstrate the productivity of important farmland will not be reduced after reclamation, such land may be mined even if there are practicable alternatives, but only if the mining plan is consistent with national policies concerning food production.

F. Problem.—Surface coal mining operations often only extract coal ore from the single or few seams nearest the surface. This makes it relatively more expensive later to mine the deeper seams. Moreover, reclamation costs and the danger of reduced soil productivity are enhanced.

Potential action.—Amend Title V of the Surface Mining Control and Reclamation Act of 1977 to require review during the permit process of coal seams underlying the seams that are proposed for mining. The permitting agency would be granted authority to condition the permit on an agreement to mine additional seams. Criteria would be: (1) the cost of and land productivity and erosion damage due to multiple reclamation, (2) economic costs of mining the additional seams as compared to fair market value and (3) likelihood deeper seams will never be mined if not done during the proposed mining plan due to the need to again remove all of the overburden from the initial mining effort.

G. Problem.—Several coal producing states have enacted severance taxes for mined coal. Moreover, the amount of tax has been increasing. Such policies discourage coal use by raising the cost of this fuel. In addition, such taxes are inimicable to the national interest unless there is a strong countervailing state interest that furthers other Federal policies. If Congress permits such practices to continue without some controls, the concept may spread to other minerals, commodities and manufactured products with resulting interstate friction.

Potential action.—Enact Federal legislation setting a uniform limit on the severance tax that can be imposed by a state for coal and other mineral extraction. The determined limit should take into account the national policy to use coal in place of scarcer fuel sources and that amount of funds a state will require to mitigate adverse environmental and socio-economic impacts due to coal mining operations.

H. Problem.—Much coal in the United States has a relatively high sulfur content which may preclude its use as a fuel under the Clean Air Act as implemented by the U.S. Environmental Protection Agency (EPA).

Potential action.—Enact legislation to: (1) give states authority to waive or raise New Source Performance Standards allowable levels of SO₂ emissions for given facilities, so long as the State Implementation Plan provides companion mitigation measures from other sources to result in no net increase in emissions due to the waiver or relaxed limits (this is similar to an extension of the present EPA "Bubble concept") and (2) provide Federal funds for intensified research on methods for using high sulfur coal as a fuel source.

I. Problem.—The National Historic Preservation Act of 1966 established a national policy of protecting cultural resources. As interpreted and implemented by the Advisory Council on Historic Preservation and Heritage Conservation and Recreation Service, USDI, it appears that a relatively low threshold has been set for judging a cultural resource as culturally significant. Consequently, over a hundred thousand of sites may exist in a state that are eligible for listing in the National Register of Historic Places. The existence of so many sites creates delay in approving electric generating projects, added cost for data recovery, and may preclude use of otherwise suitable sites for power projects. This problem is amplified for coal-fired generating projects, since potential cultural resources in the mining area must be investigated.

Potential action.—Congress should investigate the criteria and thresholds used in declaring sites to be eligible for listing in the National Register of Historic Places. Corrective legislation should be enacted to concentrate protection on a smaller number of very significant cultural resources.

A number of existing and proposed environmental laws, regulations and procedures needlessly impact on coal-fired electric generating stations and other major

power producing facilities. For marginal, if any, environmental benefits, project costs are materially increased, delays are incurred, and planning is rendered uncertain.

J. Problem.—Prior to the point when all Federal and state permits, financial assistance and approvals have been obtained for a project, most projects are subject to reevaluation on the basis of (1) new environmental laws and regulations not in existence during the early planning stages of a project, (2) previously undisclosed information and (3) new entries to various lists of protected items (e.g. historic sites, threatened and endangered species). Consequently, the planning process is subject to ever changing rules, the project cost can not be confidently predicted, and large sums of capital are invested with no guarantee that a late concern will preclude the project. Intervenor often generate information late in the process and use it as a basis for seeking delay through judicial relief.

Potential action.—Enact legislation which would establish a deadline by which all major environmental input to a proposed project should be made. We suggest that date be 30 days after issuance of the final Environmental Impact Statement (EIS) by the lead Federal agency. After that date no party could raise new significant environmental issues or provide relevant data in support of or in opposition to a proposed Federal action on environmental factors. Moreover, new Federal environmental legislation and regulations would treat proposals for which an EIS had been issued before enactment or adoption as final rules as existing facilities.

K. Problem.—Sometimes during construction or operation of a facility changes are made in its configuration due to economic, technical, statutory or regulatory impetus which may require Federal action. Often Federal agencies with jurisdiction by law then expose the overall project to new environmental review. There is the possibility of new requirements being placed on unchanged aspects of a project.

Potential action.—Enact legislation which states that aspects for a project that are unchanged will not be reopened for environmental review if new Federal actions (e.g. approvals, assistance) are required at a later date. Review of environmental impacts will be limited only to those resulting from changes in the project.

L. Problem.—It is becoming an increasingly difficult, costly and time-consuming process to find an environmentally acceptable site and gain requisite approvals for the construction of new electric generating stations. We expect synthetic fuel facilities will encounter the same problems. Such delays and cost escalation discourages utilities and other fuel users from closing existing facilities which depend on relatively scarce fuels and substituting coal-based energy.

Potential action.—Enact legislation which requires states to set aside "acceptable" sites and air increments for power and energy projects as a pool of alternatives that will be available when future needs dictate their construction and operation.

Use of coal can also be increased by substituting it for other fuels such as natural gas and oil which are in relatively short supply. Electric generating facilities presently are being converted to coal under the Fuel Use Act. However, there are other means of replacing oil and natural gas with energy in the form of electric power derived from coal and other sources.

M. Problem.—Increased use of coal and other energy sources is hampered by existing Federal policies that continue to encourage or at least do not discourage use of oil and natural gas.

Potential action.—Enact Federal legislation which (1) penalizes the use of oil or natural gas and propane for heating and cooling new residential and commercial buildings, and (2) provide Federal financial assistance to railroads in converting from diesel to electric power.

II. Senator Zorinsky requested information as to Cajun Electric Cooperative's need for power which justifies its participation in a joint venture with an investor-owned utility to build a new generating plant.

The accompanying Power Supply Planning and Power Cost—River Bend Participation Plan dated August 1980 is provided in response to that request.

RESPONSE TO SENATOR ZORINSKY'S QUESTION OF CAJUN ELECTRIC POWER COOPERATIVE, INC.'S PARTICIPATION IN RIVER BEND NUCLEAR PLANT

Cajun plans to purchase a 30 percent (282 Mw) undivided ownership interest in the River Bend nuclear plant (Unit 1) now under construction by Gulf States Utilities Company. A request has been made to the Rural Electrification Administration (REA) for financial assistance in the form of a loan guarantee. This request is currently being considered. REA published its Final Supplemental Environmental Impact Statement in the Federal Register on August 8, 1980, indicating that the proposed action by REA in providing financial assistance will be consistent with the policies set forth in the National Environmental Policy Act. The commenting period on this FSEIS runs through September 7, 1980.

Principal alternatives considered by REA for Cajun were:

- No action (no participation in River Bend).
- Shared units with others.
- Purchase Power.
- Reduce load growth.
- No additional power.
- Alternative forms of generation.

Table 4.1.C from the Final Supplemental Environmental Impact Statement shows Cajun's projected load requirements and proposed capacity for the period 1983-1991.

TABLE 4.1.C.—CAJUN ELECTRIC POWER COOPERATIVE, INC., POWER SUPPLY PLAN FOR 1983-90 WITH RIVER BEND NUCLEAR UNIT NO. 1 PARTICIPATION

Year	Cajun load (MW)	Purchased capacity (MW)	Net requirements to (MW) *	Generation additions (MW) *	Total capacity (MW)	Surplus capacity (MW) *	System reserve percent *
1983	1430	**145	1493	*275	1565	103	22.45
1984	1580	**124	1687		1565	(98)	8.54
1985	1701	**110	1891	*380	1945	99	26.81
1986	1856	**110	2010	*275	2314	290	30.60
				*94			
1987	2025	110	2234	*94	2378	139	22.86
1988	2200	110	2425	*275	2663	223	25.08
1989	2410	110	2657	*94	2747	85	18.55
1990	2629	110	2908	**540	3287	374	29.21
1991	2868	110	3183		3287	99	18.44

*Capacity requirement equals (load minus firm purchases) times 1.15 less reserve purchases.

**CEPCO installed capacity prior to 1983 will be as follows: Big Cajun No. 1, Unit No. 1—115 MW (gas/oil); Big Cajun No. 1, Unit No. 2—115 MW (gas/oil); Big Cajun No. 2, Unit No. 1—540 MW (western coal); Big Cajun No. 2, Unit No. 2—540 MW (western coal).

*Surplus equals total capacity minus net requirements.

*Surplus plus reserve as a percent of net requirements.

*275 MW addition represents 51 percent ownership in Big Cajun No. 2, Unit No. 3 (western coal). Gulf States Utilities and San Rayburn Dam Authority have submitted a letter of intent to purchase 265 MW (40 percent) of the unit.

*180 MW represents 70 percent ownership in the first lignite unit. (Louisiana lignite). Other utilities have expressed various interest in participation in CEPCO's lignite units. Decisions leading toward a decision of participation in these units are planned in the near future.

*275 MW addition represents 51 percent ownership in the second lignite unit. (Louisiana lignite). Similar participation arrangements as described for the first lignite unit.

*The three increments of 94 MW each represent participation in the 940 MW River Bend No. 1 unit under construction by GCU. Based on information available, this unit will be completed by the 1985 peak. The increments shown represent the portion of this unit's capacity required in 1985, 1987 and 1989 to meet the CEPCO's load requirements with GCU buying back the capacity of the balance of the 30 percent owned by CEPCO during 1985, 1986, 1987, and 1988.

*275 MW addition represents 51 percent ownership in the third lignite unit. (Louisiana lignite). Similar participation arrangements as described for the first lignite unit.

*540 MW addition represents 100 percent ownership in the fourth lignite unit. (Louisiana lignite). Participation arrangements have not been considered for this unit at this time.

**115 MW firm purchase has been arranged from Tex-La/SWEPCO in 1983. 100 MW non-firm purchase available from CEPCO in 1983.

**10 MW firm purchase from Tex-La/SWEPCO and 74 MW of hydro peaking capacity have been allocated from SPA.

**As allocation of 110 MW of hydro peaking power will be available from SPA.

RETAIL RATES

Retail rates are changing at a very rapid pace. It is extremely hard to make a comparison on all Rural Electrification Administration (REA) borrowers.

A telephone survey was made recently and the results were almost the same as the last general survey in 1977. Approximately half of the REA borrowers have higher rates than adjoining RCU's and half have lower.

The information concerning States that regulate REA coop retail rates is inconclusive.

COST OF 1,000 kWh PURCHASED BY RESIDENTIAL CONSUMERS OF RURAL ELECTRIC MEMBERS ADDING NEW CUSTOMERS OR MUNICIPAL SYSTEMS. MAY 1980 RATES INCLUDING FUEL ADJUSTMENTS

From:		\$47.45
The Lyon County Electric Coop., Inc. *		* 38.50
Karnes Power & Light Co.		* \$48.50
From:		
Beckley-Lane County Cooperative		22.50

**COST OF 1,000 kwh PURCHASED BY RESIDENTIAL CONSUMERS OF RURAL ELECTRIC MEMBERS
ADJOINING IOU CUSTOMERS OR MUNICIPAL SYSTEMS. MAY 1980 RATES INCLUDING FUEL
ADJUSTMENTS—Continued**

Oregon—Continued		\$33.04	\$30.31
Pacific Power & Light			
Virginia:		65.33	
Prince William Electric Cooperative ¹		\$ 62.70	\$ 69.19
Virginia Electric Power Co.			
Indiana:		46.74	
Tipton Rural Electric Membership Corp. ¹		45.36	
Public Services, Indiana			
South Dakota:		47.00	
Codington-Clark Electric Coop., Inc.		59.13	
N W Public Service		74.29	
Waterbury Municipal System			
Minnesota:		68.80	
Dairyland Electric Coop., Inc.		57.46	
Minnesota Power & Light		52.70	
Grand Rapids Municipal Systems			
Mississippi:		61.84	
Twin County Electric Power Association		47.61	
Mississippi Power & Light			
South Carolina:		48.89	
Berkley Electric Coop., Inc.		68.79	
South Carolina Electric & Gas			
Texas:		49.60	
Lighthouse Electric Cooperative, Inc. ¹		57.26	
Southwestern Public Service Co.		51.12	
Hamilton County Electric Coop. Association		\$ 43.39	\$ 46.69
Community Public Service Co.			
Missouri:		54.13	
Howard Electric Cooperative		53.55	
Fayette Water & Light Co.		46.70	
Central Missouri Cooperative, Inc.		\$ 56.17	\$ 60.93
Missouri Public Service Co.			

¹ Regulated by State Public Utility Commission.

² Winter.

³ Summer.

Senator ZORINSKY. Our next witness is Mr. Robert D. Partridge, executive vice president of the National Rural Electric Cooperative Association.

Mr. Partridge, if it is possible to limit yourself to 10-minutes for an opening statement, I would appreciate it.

**STATEMENT OF ROBERT D. PARTRIDGE, EXECUTIVE VICE
PRESIDENT, NATIONAL RURAL ELECTRIC COOPERATIVE
ASSOCIATION**

Mr. PARTRIDGE. I will do the best I can.

My name is Robert D. Partridge. I am executive vice president of the National Rural Electric Cooperative Association. The gentleman to my right is Mr. Dean Searls, manager of Adams Electrical Co-op in Camp Point, Ill.

Following my remarks, he has a brief statement to make. He is the chairman of our National Rural Electric Cooperative Association's Special Committee on Energy Conservation, and he has devoted a great deal of time to this entire effort.

With your permission, I would like to submit my statement for the record, together with the attachments to it.¹

Senator ZORINSKY. Without objection, it will be included in the record.

Mr. PARTRIDGE. There are three resolutions adopted by our membership at our annual meeting in March, a report of our Energy Conservation Survey, which we did jointly with REA, and a news release summarizing that survey. Also a partial listing of the supplemental and alternative energy projects underway by the Rural Electric Cooperatives. I think that is attached. If it is not, I will make it available.

I also have a statement submitted by another member of our Energy Conservation Committee, Milton D. Hines, manager of Gualupe Valley.² He and his staff have a very active program of weatherization and energy conservation. I know that is not included. If I may provide this for the records of the committee, I think it will be useful to the committee.

Senator ZORINSKY. Without objection, it will be received.

Mr. PARTRIDGE. Rural Americans have been well aware of energy and resource conservation generally. It has been the hallmark of the rural electrification program, and we are keenly aware of the need for efficiency in the management and utilization of our energy resources.

At the same time we continue to recognize our obligation to provide our consumer members with an adequate and reliable supply of energy, electrical energy, at the lowest possible cost.

As a primary supplier of electrical power in rural America we are concerned about the ability of low income people to avail themselves of energy conservation programs, particularly weatherization, and also about their ability to meet their rising energy costs, and to meet their energy needs in the face of ever-rising energy prices. Without programs specifically aimed at their needs, even our best efforts will not accomplish the task that needs to be done.

There are no quick and easy solutions to the energy problems which face our country. Conservation is a necessary tool, but not a sufficient tool, if we are going to help ourselves overcome our energy problems. Conservation is indeed one of the key elements, but not the only one, by any means.

In March we appeared before the counterpart committee on the House side in hearings such as you are having here this morning. Several witnesses at that hearing expressed their beliefs that because rural electric power supply cooperatives are continuing to build generating plants, perhaps they are demonstrating a lack of interest in conservation, load control and the development of supplemental or alternative energy sources.

Further, these witnesses, some of the witnesses in that hearing, seemed to feel that there would be no need for more central generating stations if we placed a wind or solar generator on every farm or rural home.

Rural electric systems have been, and are fully considering conservation, load control, and supplemental and alternative energy

¹ See p. 51 for the prepared statement and attachments submitted by Mr. Partridge.

² See p. 68 for the prepared statement of Mr. Hines.

sources in their long-range planning. You will have other witnesses who will be appearing before you who will detail what they are doing in this field.

Members of this committee know from reports that have had the currency in the press and in the media generally, that some of these supplemental energy resource projects, particularly those related to wind and solar generators are costly, their reliability has not been proven in many cases, and there are serious, unresolved technical and safety questions regarding their integration into the central station, power network, and grid.

We have begun a study that we hope will lead to a resolution of some of those problems, but there are no quick and easy solutions. We are moving into this field, and have been for quite some time.

The Administrator of REA cited figures which indicated how much our loads have dropped. The Administrator of REA cited preliminary figures which indicated the growth rate for all rural electric distribution co-ops for 1979 is likely to be less than 3 percent—a dramatic drop, from even recent trends, and historic records. There is no question about it. Conservation is being accomplished.

This is a very sharp drop from what we have had. At the same time, some, particularly those who appeared in House hearings, characterized that decline as not good enough. Perhaps in the eyes of some it is not good enough, but I would not want to mislead anyone, particularly this committee, into believing that the growth rate in electric usage by rural people is going to continue to show significant or dramatic declines.

Besides recognizing that our rural areas continue to gain in population—we are getting about 1 million new residents each year who get new service—we are seeing an increase in the substitution of electric power for fossil fuels. We have to keep in mind that the major efforts of conservation are aimed at conserving oil and gas. Those are the things we are bleeding and paying for abroad, as the chairman indicated in his opening remarks.

I think that means that electricity generated by hydroelectric dams, coal-fired plants and nuclear reactors not only is relatively plentiful, but use of it in place of oil or gas is also in the national interest, and these, all of these and other facts, suggests that as America shifts from an economy based on oil and gas to one based on other energy forms, it is inevitable that the use of electricity generated by these other energy forms will increase rather than decrease.

We could spend a great deal of time discussing what the potential is there. The electric automobile is one real possibility, and there are many others that can be cited.

So, in the long run, we are going to have to place more, and not less, reliance on central station generating capacity.

At the end of 1979 we surveyed our 908 distribution-type members to determine the extent of their involvement in energy conservation, load control and alternative or supplemental energy programs.

Since a copy of this survey and a summary of it are attached to my statement, I am not going to take the time of the committee to review it in detail. In summary it does demonstrate a growing

commitment by the rural electrification program to conservation and wise use of energy resources.

The committee which Mr. Searls heads reviewed the findings from that survey. I think they were encouraged certainly by the growing commitment to energy conservation and the accomplishments which we had. The committee pointed out a number of things that are inhibiting many systems in the development of strong energy conservation programs.

Among these are a fear that a maximum conservation effort might substantially increase unit costs—you discussed it with Mr. Feragen—and force retail rate increases. There is a need for financial and staff resources for augmentation of these to conduct energy conservation programs. There is in many cases a lack of knowledge of how to develop a strong, effective program. There is a need for effective consumer education programs because of the uncertainty over State and Federal regulatory requirements. These do play a role in the conservation area.

In the face of spiraling costs that we have on the energy front, the rural electricians are particularly concerned about the possible impact of energy conservation on their revenues, and the chairman's questions to the Administrator reflected some of those valid concerns.

Many of our people have said, and accurately, that they cannot afford to conserve themselves out of business. One of the things you have to do, if you are a successful utility system, dedicated to a dependable electrical service at low rates, is to stay in business, and that is not easy with the low density and low revenues which we have.

All of these are concerns and impediments to accomplish these kinds of programs. If there is not enough revenue to meet fixed costs, the unfortunate result is higher rates.

The irony to the consumer is that the more electricity he saves, the higher the unit cost will eventually be.

At our annual meeting, back in early March, where we go about to develop policy for our association for the coming year, we had high on the agenda for the meeting an in-depth review of our energy conservation activities, and consideration of recommendations to reinforce those activities. Coming out of our meeting we had a number of proposals which we think merit consideration.

First, the resolution asked for authorization of a low-interest rate program to provide for purchase and installation of weatherization and other conservation materials and equipment, and for load control, heat storage, or other devices or equipment to conserve energy on the consumer's premises.

The REA Administrator announced, even before adoption of this resolution, that his agency—acting under authorities in section 12 of the Rural Electrification Act—is now prepared to defer principal payments for any borrower willing to dedicate these funds to low-interest loans to consumers for weatherization activities.

We think that is a program which has merit and a great deal of potential, and we commend the REA Administrator and his staff for the initiative. We know that that program will not provide loan funds for all of the things that need to be undertaken, and there is

a need to consider what additional authorities may be needed to further the efforts in the conservation area.

We believe there is also a need for REA to have a grant authority for the purpose of providing research and development on supplemental and alternative energy resources. There is no such authority at the present time. There is some authority, and some funding at the Department of Energy, but we have not been notably successful in bringing to bear those authorities and those moneys.

We know we can, and do work well with REA, and it is an agency which can do the job. We simply mention our support for title II of the Energy Security Act, Senate 932, which is now pending in Congress, which has some authorities in the field which we feel would be useful.

We also recommended to the Appropriations Committee in our testimony for REA, that it be authorized and funded for additional staff. The work of the energy conservation staff is not something that can be done offhandedly. It will take staff who can go out and train and promote, as we did promote, the use of electric power in the beginning, in order to assist in getting across to rural residents what they could do with electric power.

In like fashion, it will be necessary to show what can be done with conservation, which takes trained, competent people, people which REA does not have, and cannot spare, and which we feel it badly needs. There is also need for additional personnel in the communications field.

We recommended to the Appropriations Committee, and I hope they take kindly to our suggestion, that the staff needs to be augmented by not less than 20 persons. We think this would be a very modest, but important contribution in enabling REA to go ahead with this job.

Finally, as our fifth recommendation, we dealt with the financial integrity of the co-ops, and the need for the systems to be protected from short term, but very substantial effects because of the conservation and lower use of electric power, recognizing that fixed costs are there, and are not going to drop much. It may very well be necessary that payment deferrals under section 12 be done in some cases.

There would be authority for loan forgiveness in those cases where a cooperative simply could not make the grade. Nothing like that has happened yet, but it could.

There is a limit, of course, as to what low-income members can do in energy conservation and in weatherization, and our resolutions dealt with that as well.

We think, Mr. Chairman, that the rural electric program, with the guidance and help of this committee, and the committee on the other side, has demonstrated what can be done with Government and people working together. We believe the conservation job is one which can be done, will be done, and must be done, and we are grateful to you for holding these hearings.

I will be glad to respond to your questions, and I hope that you will hear from Mr. Searls.

STATEMENT OF DEAN SEARLS, MANAGER, ADAMS ELECTRICAL COOPERATIVE, CAMP POINT, ILL.

Mr. SEARLS. Thank you, Mr. Chairman and members of the committee. I will be as brief as I can.

I am Dean Searls, chairman of the Energy Conservation Committee, an ad hoc committee appointed by the National Rural Electric Cooperative Association. This committee is comprised of 10 members, each one representing each of the 10 regions of the National Rural Electric Cooperative Association. As a member of the Energy Conservation Committee, I represent region V, comprised of Iowa, Wisconsin, and Illinois. Two years ago, I assumed the chairmanship of this committee.

As manager of Adams Electrical Cooperative of Camp Point, Ill. for 39 years, I have had the opportunity to work closely with our 7,000 members promoting the efficient use of electric energy to lighten the household tasks and to increase the profitability of farming in the production of food and fiber.

We have always advocated the efficient use of electrical energy to whatever task it was applied. The cooperative I manage has been a leader in electric space heating. We learned at the very outset that space heating could not compete with other fuels unless the consumer agreed to follow very strict rules on insulating the building and applying storm windows and storm doors. Where our recommendations were followed, the user was well satisfied with the results. Other cooperatives throughout the country have followed this same plan and have had equally good results. So for many years in the past, we have been conserving electric energy by proper installation, application, and insulation.

My main purpose today is to report on the work and accomplishments of this committee. May I state from the very outset that our committee does not believe that energy conservation is the complete answer to the energy problems this Nation is facing. We do believe, however, energy conservation has a proper role to play in meeting our future energy needs. While it has always been our aim to promote the efficient uses of electric energy, the economics of today's energy picture requires us to take a new look at all electrical applications.

For example, when we started to promote the use of electricity for residential space heating, we recommended 6 inches of insulation in ceilings, but today we are recommending 12 inches because of the higher cost of electric power. Where practical, we promote the use of alternative energy sources. A prime example is the use of solar energy in grain drying. Solar energy is also finding a useful place in confinement livestock buildings throughout the Midwest.

The Energy Conservation Committee has devoted a great deal of time and effort toward improving the efficiency of electric energy applied to agricultural purposes. The following is a chronological summary of major activities and involvement of this committee.

One, assisted USDA, FmHA, and REA in launching the FmHA weatherization loan program. Several committee members, representing their individual REC systems, participated in historic signing ceremonies with Secretary of Agriculture Bob Bergland, of a

weatherization loan program agreement between FmHA and local REC systems.

Two, developed an ongoing working and coordinating relationship with USDA, FmHA, and REA in regards to energy conservation and weatherization policies and programs. Participated with the Administrator's office in developing energy conservation requirements in REA bulletins.

Three, developed support for higher FmHA thermal standards for home construction. Recommended that NRECA join FmHA in a potential lawsuit brought by the National Home Builders resisting higher thermal limits.

Four, called together National Home Builders and insulating manufacturers to promote and discuss higher thermal standards and quality of insulation and construction.

Five, review and comment on various research and development projects relating to energy conservation, rates and load management.

Six, participated in the planning and implementation of NRECA energy conservation, audit and weatherization-related educational responsibilities.

Seven, committee as a whole and as individual members lends support and participates in energy conservation, weatherization and related programs and seminars on a State and regional basis.

Eight, review and participate in legislative hearings in regard to energy conservation and weatherization.

Nine, developed and promoted energy conservation work plans and budgets in response to new REA bulletins.

Ten, recommended that NRECA place high priority status on energy conservation activities including the establishment of a permanent standing committee with priority responsibility in energy conservation.

Eleven, from the first meeting in 1977, the Energy Conservation Committee has been involved in numerous energy conservation/weatherization activities. Energy conservation is the cornerstone of our national energy policy.

Twelve, encourage NRECA and REA to develop a national energy efficient home program.

Thirteen, encouraged REA to develop the red book on energy conservation, which has been distributed to all distribution cooperatives.

I appreciate the opportunity to appear before this committee.

Senator ZORINSKY. Thank you, Mr. Searls.

Senator Hayakawa?

Senator HAYAKAWA. No questions. It was a very, very clear exposition.

Thank you very much.

Mr. SEARLS. Thank you.

Senator ZORINSKY. Do you think REA needs a research capability of its own, so that it can deal with rapidly changing technology in electric generation and telecommunications? Do you think REA needs a grant authority so that it can try out unproven technology without risking loans?

Mr. PARTRIDGE. Mr. Chairman, if I may answer the latter part of the question first, I think REA definitely does need funding to try

out untried technology or, through its borrowers, try out technology alternatives in the alternate energy field.

As to in-house capability of REA, I have mixed feelings. There is no question that it is needed. It is a relatively small agency. It would be difficult to have in-house the kind of research and development laboratories and personnel which would be required.

I think we must, as we have in the past, rely principally upon other elements of both Federal Government, land-grant colleges, the manufactures and others. The REA does not have this capability presently in any of the other categories of its requirements, and I have serious reservations in my own mind whether it would be cost-effective to try to develop this within the agency itself. No question, it is needed.

Senator ZORINSKY. I have just one final question for you and Mr. Searls to answer.

Having been a board member of a power district myself, I have had some personal experience with regard to how anxious bondholders are to make sure that utilities meet their obligations in repayment of their bonds.

Do you feel, in this last decade, from 1970 to 1980, that REA is attempting to change that? I am not familiar enough to know whether your philosophy was like our own.

In the early seventies, power districts figured on a doubling of generating capacity every 10 years as a yardstick.

When we start talking about the conservation of energy, of course, that yardstick becomes obsolete. We used to sell electrical generating capacity based on the principle that the more you used, the less per kilowatt hours you pay. This entire philosophy is meeting with a complete and total reversal, where people are adopting the philosophy that the more you use, the more you should pay.

Do you feel that REA is doing this sufficiently to reassure the ratepayers, that if they conserve, it is going to cost them less money. Otherwise why shouldn't they conserve, because then they will need more money?

At the time I felt we were painting ourselves into a corner. We were trying to increase generating capacity and, at the same time, conserve, and there is no way you can pay off bondholders with that type of business approach.

Mr. PARTRIDGE. I think that is a dilemma. Anything we can do to postpone, through conservation, and by other means, the financing and the construction and placing online of generation or transmission facilities is to our advantage. If we can stretch out by conservation, or whatever means, the appointed time in the future at which we have to come onboard with a new plant, we could hardly be worse off than we would be if we had to go to that plant today.

As high as interest costs and construction costs are, it makes good sense to postpone for the future as early as you can, and as much as you can, the construction. At the same time, considering the leadtimes which are involved on these plants—typically 10-years on a coal-fired plant, and 14-years on a nuclear plant—you dare not wait too long, and some of the studies made by the Electric Power Research Institute on this very question have come down on the side if you are going to err within reasonable limits of

erring, you better be on the side of moving a little too quickly in putting these facilities on, else you will really pay through the nose as a consequence.

Again, this is within ranges. We are talking about the ranges of errors you might have in estimates made by good and prudent and competent estimators and load forecasters. I do not think REA has any reason to hang its head.

In fact, it can hold its head quite high on the advice and counsel they have given on these scores. We feel they have done well.

Mr. SEARLS. May I speak to this?

Senator ZORINSKY. Yes.

Mr. SEARLS. We will see greater emphasis on managing the loads on our system, so we can defer the peaks, put them in the valleys, so we can use our generation over a longer period without having to add the costly generation that we are referring to.

It means that we may have a little bit of shifting of lifestyle among our people in order to accomplish that, but I believe it can be done, and the people will be willing to do that, rather than to pay the very high cost of energy which is facing us if we do not do it.

I think it is a tradeoff here that we have got to realize. We have got to put more emphasis on this load management.

Senator ZORINSKY. Do you feel that the wheeling of power has been exhausted?

Mr. SEARLS. No, it has not been exhausted, but more than that, I think our own consumers can adjust their usage power. For instance, in our own office building, we installed an off-peak heating system, in which we heat the water at night off-peak, and then we use the heat off that water during the daytime for our office building. We have to have more people doing that type of thing, so we can use our generating facilities on a 24-hour basis, rather than just over a few peaks during the day.

Senator ZORINSKY. That makes sense.

Mr. PARTRIDGE. There are a couple of points that occurred to me as you and Mr. Searls were discussing the matter, which I would like to make, if I may.

As a result of financial difficulties which the investor-owned utilities have had, and after that the fact that most of the hydro-electric capacity under construction is online so the Federal input into the grid systems that feed the REA system is not growing rapidly at this point, and because of these things, we have had to build our own generating capacity to the extent which never characterized this program until beginning about 10 years ago. We have gone into more generation and transmission than the program ever experienced until about 1970.

The other matter that I want to suggest, and I really would not want to know the answer to it, but I would want to suggest it only as something that we must have in mind, and must consider. Recognizing the horrendous problem and danger to this country of continued importation and dependence on oil that we have, almost half coming in from abroad, \$90 billion a year, enough to buy the entire State of Iowa in terms of land values in 1 year going out in oil payments abroad, the broad question is shouldn't we move

aggressively in the direction of the substitution of the electric power for the use of liquid fuel and gaseous fuel.

We do have an abundance of coal, as Senator Jepsen pointed out earlier. Unfortunately, a lot of that we are not able to use for a lot of reasons, mostly environmental in nature, but we do have coal, and we do have an enormous reserve of nuclear fuel in this country, as well.

The question I would put is: Are we not, as a matter of public policy, moved to use those, and cut off our dependence on oil? If the answer is yes, then we are not building generating plants, either in rural electrification, in your State and elsewhere, or in the investor-owned utility. We simply are not getting those plants online, and when you look at that leadtime, you have to realize that if the answer is yes to the question I put, that the solution may be an academic matter in terms of what we are really capable of doing.

Senator ZORINSKY. Senator Burdick?

Senator BURDICK. I want to comment on your very excellent statements, and to thank you for them. They point out the necessity for alternative and supplemental energy, but both of them put their finger on a very important factor.

Mr. Searls, in his written statement, and Mr. Partridge, in his oral testimony, indicated that we can practice a lot of conservation by load estimates, not only locally, but nationwide. They put their finger on a very important element.

Thank you.

Senator ZORINSKY. Thank you.

Mr. Partridge, you are very articulate. I think you ought to be doing radio ads for the National Rural Electric Cooperative Association, because you have an excellent radio voice.

Mr. PARTRIDGE. I appreciate the compliment, but I have enough trouble. Thank you.

Senator ZORINSKY. I would like to call the next three gentlemen as a panel, Jeffrey L. Nelson, staff assistant to the general manager of East River Electric Power Cooperative, Inc.; James Grahl, general manager, Basin Electric Power Cooperative; and Rex Carpenter, general manager, Nebraska Rural Electric Association.

Senator BURDICK. Mr. Chairman?

Senator ZORINSKY. Yes, Senator Burdick?

Senator BURDICK. May I have the opportunity to introduce Mr. Grahl to the committee?

Senator ZORINSKY. Certainly.

Senator BURDICK. He is a pioneer in the development of power, in the use of lignite coal, he is the manager of one of the largest cooperatives that broke the ground for power for REA under public use.

It is a pleasure to introduce him at this time.

Senator ZORINSKY. Thank you.

I am sure a like introduction would be given by Senator George McGovern, if he were still here, to welcome Mr. Nelson from South Dakota, and I, likewise, extend such a welcome to Rex Carpenter.

Mr. Nelson, would you want to proceed?

STATEMENT OF JEFFREY L. NELSON, STAFF ASSISTANT TO
THE GENERAL MANAGER, EAST RIVER ELECTRIC POWER CO-
OPERATIVE, INC., MADISON, S. DAK.

Mr. NELSON. Mr. Chairman and members of the committee, my name is Jeffrey L. Nelson and I am staff assistant to the general manager of and represent East River Electric Power Cooperative, Inc., located in Madison, S. Dak.

If my statement can be submitted for the record, I will briefly summarize it.

Senator ZORINSKY. Your complete statement will be made a part of the record.¹

Mr. NELSON. East River serves wholesale electric power to the east half of South Dakota and part of western Minnesota.

East River has a long record and serious commitment to the goal of energy conservation and the development of renewable energy resources that dates well before this recent energy crisis. There has been a sensitivity literally from "day one," at least in South Dakota, by REC for the need to do that. My statement describes in some detail those projects and efforts which East River has made along with its members and have supported, encouraged, and worked very hard to develop. I do not intend to go through them.

We have supported and vigorously encouraged home insulation for over 25 years and we welcomed the program outlined earlier by Administrator Feragen. We believe in South Dakota that there would be an enthusiastic response which will be much better than the Farmers Home Administration program that admittedly was not successful.

East River has been a pioneer in the development of solar energy in South Dakota. Beginning in 1973 East River pioneered the first successful solar crop dryer. This effort directly contributed to what now is commercially available solar crop dryers on the market.

We have also supported and will continue to support the use consistent with Robert Partridge's comments of using electricity to displace fuels that can be used for mobile applications, particularly in space heating. Our major emphasis has been on the installation of the energy efficient heat pump. We believe that is appropriate and we will continue to support that.

In 1978 we joined in sponsoring a demonstration project for the installation of time-of-day meters which are being used for determining the applicability of time-of-day metering within our service area.

Our load management efforts instituted 2 years ago center on our energy alert program. Our energy alert program solicits voluntary load management by encouraging our consumers to use only essential electrical equipment during those times when we are experiencing high electric demands on our system. The result of this ongoing program has been a significant damping of our peak demand for power.

In January 1978, the East River board of directors allocated a \$30,000 grant to South Dakota State University to conduct research on the potential for using waste organic material in the production of alcohol fuels in a farm-sized alcohol production unit. In keeping

¹ See p. 88 for the prepared statement of Mr. Nelson.

with our commitment to reduce dependence on foreign oil and using renewable resources, East River Electric became the first major business in the upper Midwest to convert its entire fleet of vehicles from gasoline to gasohol in February of this year.

We are presently working on a demonstration vehicle to use 100 percent alcohol. This demonstration follows the use by East River of an electric car beginning in 1961 until 2 years ago when we retired that vehicle to a local museum.

We have supported and will continue to support, despite criticism from people who believe it is not appropriate, the development of major hydroelectric projects such as the Gregory County pumped storage unit which could be constructed which would increase the power capacity of the Missouri River mainstem system by 58 percent, and save over 2.4 million barrels of oil annually with minimal environmental or social disturbance. We think that is a very appropriate Federal investment.

I think that this committee should understand very clearly that the loads and requirements for electricity are a function of the demands by the end user. Cooperative boards and management cannot and should not make these choices for the consumer. We have and will continue to make conscious, deliberate efforts to encourage the wisest and most efficient use of electric resources, but in the final judgment, the decision on energy use must be made by the consumer.

A significant problem for rural electric cooperatives is the tremendous and continuing increases to our rates. Interest costs alone are forcing electric rates to unprecedented levels, and when coupled with depressed commodity prices and near 20 percent inflation, much unrest among rural electric consumers is understandable. This pressure of increased rates really is at odds with the equally increased pressure to make further commitments to energy conservation and weatherization programs. They are irreconcilable.

In 1978, the total expenditures of East River were \$17,610,837. Of that amount the controllable costs, in other words, those costs other than taxes, depreciation, interest, and purchased power, accounted for only 12 percent. The controllable costs include payroll, operations, and maintenance. In 1979 that controllable amount was 11 percent out of total expenditures of \$21,889,036. We expect that controllable percentage to continue to decrease. From those controllable dollars in 1978 and 1979 we paid over \$950,000 in patronage capital credits.

It is from those controllable dollars that we must perform all alternate energy and conservation efforts that we are being asked to do.

I recently testified before the National Alcohol Fuels Commission during a hearing held in South Dakota chaired by Senator George McGovern on April 11, 1980. At that hearing I recommended to the Commission they consider the use of a direct interest subsidy loan program for the production of alcohol fuels. It is this type of program that at a very moderate cost can provide the resources that will produce dramatic gains for alternate energy development.

However, this committee must recognize that unless the rural electrics are provided at least modest resources, the accomplishments achieved will be necessarily limited.

If conservation and alternate energy are to be the centerpiece for the future of the rural electric cooperatives, we cannot be expected to accomplish miracles with promises and the talk of what a good idea it is. The realities are that inflation is affecting us as it is affecting all segments of our economy. Interest rates are forcing our rates up despite significant efforts to cut costs. We have seen serious cost cutting efforts immediately wiped out and reversed by inflation, interest rates, State severance taxes, and environmental requirements. Caught in the crossfire between those who are justifiably concerned about increased rates and those who feel more dollars need to be allocated to conservation and alternate energy programs, the cooperatives are caught in the middle. We accept that as a major challenge and will continue to provide progressive leadership in conservation and alternate energy development. We only ask REA and the help of the Congress in our continuing that effort.

Senator ZORINSKY. Thank you, Mr. Nelson.
Mr. Grahl from Bismarck, N. Dak.

**STATEMENT OF JAMES GRAHL, GENERAL MANAGER, BASIN
ELECTRIC POWER COOPERATIVE, BISMARCK N. DAK.**

Mr. GRAHL. Mr. Chairman and Senator Burdick, I appreciate the opportunity to testify before the committee. I am the general manager of Basin Electric Power Cooperative and my oral testimony will summarize the longer prepared testimony which has been supplied to the committee. I would request that the prepared statement, including the background materials and exhibits be made a part of the record of this hearing.¹

Senator ZORINSKY. Thank you. Without objection, it will be made a part of the record.

Mr. GRAHL. Dennis Lindberg is with me who is an operating farmer of Odebolt, Iowa.

Basin Electric, headquartered at Bismarck, N. Dak., is a supplemental wholesale power supplier for area power cooperatives which in turn supply power to 118 relatively small rural electric cooperatives. These consumer-owned systems provide electric service for approximately 300,000 rural families, farms, ranches, businesses, and industry—about 1 million people—in a 400,000 square mile area in the States of North and South Dakota, Montana, Wyoming, Colorado, Nebraska, Iowa, and Minnesota.

The board of directors of Basin Electric, elected from the membership, is made up entirely of farmers and ranchers who by the nature of their occupations are deeply concerned about the conservation of our energy and other natural resources.

As a major regional power supplier, Basin Electric's planning, construction, and operating activities strive for maximum economy in the use of all resources through close coordination with our member systems and with other public, private, and Federal power suppliers in the region.

Since they organized the cooperative in 1961, the members have recognized the need for energy and resources conservation. In 1962, for example, Basin Electric became the first utility in the Nation to

¹ See p. 91 for the prepared statement and background material furnished by Mr. Grahl, the exhibits are retained in committee files

require its coal supplier to rehabilitate strip-mined lands, and successfully advocated State legislation requiring this of all coal mining activity.

In 1963 rural electric and public power leaders in the region executed a landmark power pooling and joint planning agreement with the Bureau of Reclamation which coordinates Federal hydroelectric and Basin Electric's thermal power generating facilities and establishes a regionwide joint transmission system.

Because of the large geographic area served by Basin Electric and its members, the cooperative uses hydrothermal integration and the joint transmission system to meet summer and winter peak load requirements with a limited number of power supply facilities. This seasonal load diversity has saved our consumers millions of dollars in lower power bills while also conserving resources.

In 1967 the membership formally stated that:

The benefits of the development of our national resources should accrue to the people by establishing and maintaining programs and policies to protect the public interest in the maximum multipurpose development, conservation and utilization of our water and power resources.

The region's rural electrics believe it is more economical and efficient to construct fewer plants of 500,000 kilowatts than to construct numerous smaller and less efficient units of 50,000 kilowatts which cost much more money and use more fuel than the large units. Our organization has made it possible. Studies continue to show the larger units are far less costly to build and operate—and require less land for siting and less mining for fuel supply.

Today, Basin Electric has a power supply capacity of just over 1 million kilowatts. Our region has experienced rapid economic expansion in recent years due chiefly to increased agricultural production and processing and sharply increased oil and coal production. Our members forecast substantial growth in the future and we are presently developing about 1.5 million kilowatts of additional coal and lignite-fueled capacity for our member systems.

Our rural electric cooperatives in early 1978, through the board of directors, adopted a policy on "conservation of energy and load management" and established a member system advisory committee on "Alternate Energy Sources and Conservation."

The committee immediately initiated an "energy audit technician training course." And to date, 190 local rural electric personnel, including at least 1 person from 108 of Basin Electric's member distribution cooperatives, have been trained as energy auditors and many are now performing energy audits.

The program is conducted in cooperation with the National Rural Electric Cooperative Association and several statewide associations of rural electric cooperatives in our region.

Basin Electric's headquarters building which was completed in 1976 was designed to demonstrate the possibilities for maximum energy efficiency. It is heavily insulated, built into a hillside and faces southeast to gain maximum exposure to the winter sun. The heating system uses passive solar energy, body, mechanical and lighting heat as well as unique energy reclaim and storage systems, and it uses about half as much energy as a conventional office building.

In 1977 the Department of Energy selected our building for a solar heating demonstration project. The more than \$400,000 project, funded mainly by DOE, was incorporated into the existing heating system in 1978 and this past winter the solar system supplied about 15 percent of the total heating requirements of the building.

The cooperative has a biomass project underway in cooperation with a member system, to use sunflower hulls as a boiler fuel in an existing plant and in turn to supply power to a nearby proposed sunflower oil processing plant.

Last month Basin Electric applied to the Department of Energy for financing to study the feasibility of supplying low-grade waste heat for a grain alcohol plant from a powerplant we have near Wheatland, Wyo. This would be alcohol for making gasohol.

A study conducted last year by the cooperative, the Platte County, Wyoming Board of Commissioners and the Old West Regional Commission, indicated a potential at the Wyoming site for the use of low-grade heat for several horticultural applications and we will try to interest industry in those.

At the cooperative's Leland Olds Station in North Dakota, a commercial fish farm utilizing warm water from the powerplant has been in operation since 1977. Our board of directors recently approved the expansion of this project to produce 125,000 pounds of marketable rainbow trout per year.

We have recently completed an extensive 2-year study with one of our larger member systems in North Dakota to determine the possibility of load management in a rural area. Statistical data and conclusions from the study are now being published for use by our member co-ops and Basin Electric.

In February of this year the Council on Environmental Quality and the Environmental Industry Council recognized Basin Electric with an award for our leadership in the development of a dry system for the scrubbing of sulfur dioxide at coal-fired powerplants.

The new technology will not only save millions of dollars per unit but will consume less water and require less power to operate than do the wet scrubber systems in use today.

In 1975 Basin Electric entered into an agreement with a gas supplier from Detroit, Mich. for the joint development of a site in western North Dakota for the construction of an electric generating plant and a coal gasification facility.

The plant will provide electricity and steam for the gasification process, and will use lignite fines from the gasification plant to meet approximately one-half of the fuel requirements for the powerplant. Both plants will achieve economies by this joint effort.

Basin Electric's generating plant, the Antelope Valley Station, has been under construction for nearly 2 years. However, the start of construction on the gasification plant continues to be delayed but sponsors hope to be able to start construction if not this year, then early next year.

Employees at the headquarters building of Basin Electric are currently operating six 12-passenger vans as part of an employee van pooling program which is estimated to save about 12,000 gallons of gasoline each year. This was the first industrial van pool in North Dakota.

In 1979, more than 58,000 rural consumers met in annual meetings across the region as the owners of the member systems of Basin Electric. At these meetings they reviewed the operation of their cooperatives and adopted resolutions and policies to guide their respective boards of directors and management in energy conservation and load management activities.

Basin Electric and its members believe that a strong energy conservation program should be an integral part of a national energy policy aimed particularly at the saving of liquid fuels for such areas of use as agricultural production and transportation.

We support and commend the programs proposed and undertaken by the Rural Electrification Administration as new energy conservation policies and practices are put in place, as well as the plans and policies of our National Rural Electric Cooperative Association.

The proposals of the National Rural Electric Cooperative Association, we believe, merit the support of this committee and the Congress in order to give the Nation's rural electric cooperatives the ability as well as the opportunity to work with their consumer-members in a continuing energy conservation effort.

Mr. Chairman and members of the committee, I thank you very much for the opportunity to testify here today.

Senator ZORINSKY. Thank you, Mr. Grahl.

Our last witness is Rex Carpenter, general manager, Nebraska Rural Electric Association, Lincoln, Nebr.

**STATEMENT OF REX CARPENTER, GENERAL MANAGER,
NEBRASKA RURAL ELECTRIC ASSOCIATION, LINCOLN, NEBR.**

Mr. CARPENTER. Thank you, Mr. Chairman.

With me is Stan Shelpepper of the Stanton County Public Power District who is president of our State association.

Senator ZORINSKY. I welcome him also.

Mr. CARPENTER. We have several of your constituents here and members of our power districts. They are here in the hearing room and I will not try to introduce them, but if they could stand up and say hello to their Senator, I would appreciate it.

[The delegation stood up.]

Senator ZORINSKY. Very impressive. Thank you very much.

Mr. CARPENTER. Senator Zorinsky, I have submitted my statement to the committee. I will hit some of the highlights.

Senator ZORINSKY. Without objection, your statement will be made a part of the record.¹

Mr. CARPENTER. For the sake of time, I will not go into the testimony where it outlines many of the local activities that our systems have undertaken to try to conserve energy with home energy audits and weatherization. I would really like to concentrate my testimony on a program that I think is almost unique to the State of Nebraska, at least in terms of its intent, but I think it has some national significance in the fact that it represents the kind of cost effective program that has been designed to fit local situations which I think the rural electric systems are so adept at doing.

¹ See p. 108 for the prepared statement of Mr. Carpenter.

Although we are similar in a lot of ways, we are also diverse in a lot of ways. What we are doing in Nebraska is not typical of what can be done in other States, but it is typical of the kinds of things and kinds of innovative thinking that has been applied to conservation and load management.

I am referring to the efforts of Nebraska's rural electric systems to control their consumers' huge summertime demand for electrical energy, a demand created largely, without question, by the need to irrigate much of Nebraska's cropland.

Although called a load management program, these efforts to reduce or control demand are indeed a conservation program because they are designed to conserve generating capacity. The more efficient use of our generating and transmission facilities may not necessarily mean that less energy will be used, but it does mean that we can at least defer the need to build additional generating and transmission facilities at today's tremendously high costs.

To appreciate the magnitude of these efforts, let me point out that more than 5 million acres of Nebraska cropland are irrigated. Only California and Texas have more irrigated acres. But measured against the total number of acres farmed in each of the three States, Nebraska certainly ranks first in the proportion of its farm land which is irrigated. And, as opposed to gravity-flow irrigation systems common to California and Texas, in Nebraska about 80 percent of the water used for irrigation is pumped from onsite wells through center-pivot or pipe irrigation systems.

Nebraska's rural electrics supply electrical power to almost 21,000 of these wells and irrigation systems, which have a connected load totaling more than 775,000 horsepower. This number of horsepower is equal to 581 megawatts of demand. The irrigation load served by the rural electric systems equals 30 percent of the State's irrigation systems. The remainder are powered by diesel fuel, natural gas, or propane.

Last year, during a few short weeks in the middle of the summer, Nebraska farmers purchased from the rural electric systems a total of 417 million kilowatt hours of electricity for their irrigation systems. These 417 million kilowatt hours represented slightly more than 17 percent of the total number of kilowatt hours sold by the rural electrics during all of 1979.

In any case, because the electricity used for irrigation is consumed within a very short period of time during the summer irrigation season, the result is a summer peak demand of generating and transmission capacity of almost staggering proportions when compared to the same systems' wintertime peak.

The summer peak for the average rural electric system in Nebraska was slightly more than 60 percent higher than the average winter peak.

Because the spread between the summer peak and winter peak is so great, the rural electric distribution systems' wholesale power suppliers impose a ratchet charge, or a penalty, in effect, in their wholesale rates. This ratchet charge is designed to cover part of the costs of having generating and transmission facilities, or capacity, available to meet the summertime peak demand even though the capacity may be unneeded during the winter months. In 1979, 26 of Nebraska's rural electric systems paid a total of \$3 million in

ratchet penalty charges. These charges were in addition to the demand and energy charges incurred for power actually purchased and consumed.

However, and this is my point, the peak reached last summer and the ratchet charges paid in 1979 were much lower than they would have been because of the load management programs implemented by Nebraska's rural electric systems. And, because of these load management programs, the need for generating and transmission facilities was less than it otherwise would have been.

The rural electric systems of Nebraska began an extensive program to control the peak created by their irrigation loads several years ago, even before conservation was the popular theme that it is today. Today, 40 percent of the irrigation horsepower served by the rural electric systems now are under some form of load management. The number is increasing, too.

A variety of load management systems are used by the different Nebraska rural electric systems, each designed to fit their own local situations and system characteristics. Some use time clocks to shut off the irrigation systems at critical times. Some are controlled remotely by radio signals or a ripple system which sends a signal through the electric line itself. Another system uses a temperature control which shuts the irrigation system off when the temperature reaches 95 degrees and keeps it off until the temperature drops to 80 degrees.

Others use voluntary systems where the irrigators agree not to use their irrigation systems during certain hours. Load management programs are designed to hold the peak demand at the lowest possible level.

In addition to the load controls and scheduling designed to reduce the creation of higher peaks, the rural electric systems also are helping their irrigators test their irrigation pumps for efficiency.

It is difficult to assess the results of these efforts with any real certainty. The level of consumption of electricity is subject to so many variables. Local economic activity, variations in the weather, especially rainfall in our area, conversions from other fuel sources, community growth rates, rate increases, and other factors influence the use of electricity. But we are convinced that our efforts to encourage and support energy conservation has had a positive effect. For the 5-year period from 1970 through 1974, our consumers increased their consumption by 30 percent. But for the 5-year period from 1975 through 1979, consumption increased only 15 percent. In 1979, total consumption of kilowatt hours actually declined from the total number of kilowatt hours consumed in 1978 by consumers of the 24 systems in central and eastern Nebraska.

Finally, let me discuss some of the implications of these conservation efforts and some of the concerns that we have in Nebraska.

There is indeed the very real possibility that extensive conservation may actually force rates to be increased. If home weatherization and other wintertime conservation efforts reduce the wintertime peak in our State and yet the summertime peak continues to move upward, there is no question that rates paid by irrigators, at least, would have to be increased.

We know that our summer peak will continue to go up even as we expand our load management programs because two-thirds of the irrigators currently use petroleum-based fuels for powering their pumps. But they are beginning to convert to electric power in increasing numbers for several very good, commonsense reasons: The price of diesel fuel continues to go up; it is realized that diesel fuels, in any case, should be reserved for mobile field work; gas can better be used for the production of fertilizers; and it makes more sense to use electricity generated from hydroelectric, coal-fired, and nuclear facilities for these irrigation systems than it does to depend upon petroleum-based fuels which can be better used elsewhere and its supply which is largely dependent upon very unstable and expensive foreign imports.

Increasing the rates to irrigators would be especially unfortunate in our State. Agriculture is the fundamental economic activity of Nebraska. And, irrigation is critically important to Nebraska agriculture. It is the key to our State's agricultural productivity. This productivity, as you well know, also has national significance, not only in terms of our Nation's domestic food supply but also in terms of our balance of payments in international trade.

Energy conservation must be kept in perspective and must not be allowed to overwhelm energy efficiency and the shift from foreign oil imports to our domestic energy sources. And we must not let the burden crush one of the Nation's most productive people, the American farmer.

Again, thank you for letting me speak here.

Senator ZORINSKY. I want to thank you, Mr. Carpenter, Mr. Grahl, and Mr. Nelson for your articulate presentations of the current situation which confronts the industry. There are some circumstances which, if we approach them from the wrong directions, will only be exacerbated. I think by working together with the administration, and with the rural electric cooperatives, we can resolve this to the best interests of the ratepayers, agriculture, rural areas, and all those concerned.

I want to thank you very much for taking the time out of your schedules to be with us to present your testimony with your recommendations.

Is there anything any of you would like to add?

If not, Senator Burdick?

Senator BURDICK. No, I think the three gentlemen have covered the ground quite adequately.

Senator ZORINSKY. I would just like to say in conclusion that I want you to know that this committee is a friend of REA and we are certainly going to do what we can to cooperate, the end result being an adequate electric service to rural areas at the lowest available cost.

Sitting in this position as chairman of the subcommittee reminds me of a story. It is very dangerous to tell ethnic stories as a politician, but I would venture this one. It reminds me of the story of the Italian immigrant who came to this country. He studied long and hard to become an American citizen. He had to learn the answers to many questions and the day finally came when he went before the judge.

He said, "Mr. Judge, Ima no capeche English."

I don't know how you are going to write that down on that machine.

"I'm not understanding the English. I'm speaking with a broken English. I'm afraid I will not be able to answer all the questions of the Constitush."

The judge looked at him and said, "As longa as I'ma sit up here, you get anything you want."

With that, this hearing is concluded.

[Whereupon, at 11:40 a.m., the subcommittee adjourned, subject to call of the Chair.]

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APPENDIX

STATEMENT OF ROBERT W. FERAGEN, ADMINISTRATOR, RURAL ELECTRIFICATION ADMINISTRATION, U.S. DEPARTMENT OF AGRICULTURE

Chairman Zorinsky, members of this subcommittee, I appreciate the opportunity you have provided the Rural Electrification Administration (REA) to appear here today and to discuss with you the very considerable effort which REA and its borrowers are jointly waging to realize the national goals and purposes of energy conservation.

The general policy of REA on energy conservation requires of REA borrowers certain expressions of corporate will and accompanying follow-up actions before REA makes a loan to a rural electric system. It is not a program which deals directly with individual electric consumers. It is rather, a program which utilizes the present authorities of the REA program of financing, advice and assistance to about 1,000 rural electric utilities in the United States. The REA conservation program is tied to this process in such a way that national objectives of energy conservation will have its ultimate effect upon the "end-uses" of the individual members of a local rural electric cooperative.

The REA policy, which applies to all rural electric systems financed by the agency, requires that before a loan is made the board of directors must act upon an energy conservation policy resolution. The policy resolution is the corporate instrument under which the majority of rural electric business is conducted, and such a declaration establishes a policy of energy conservation as a major goal of the cooperative. Implementation and action upon the resolution is provided for in the REA policy by further requirements to assure that there is effective action by management to follow through on the resolution. The REA policy calls for reports on activities of the rural electric cooperative itself to constantly examine and to produce energy conservation results in its own day-to-day operations—and to integrate energy conservation goals into its long range planning. Further, the REA borrower, must, before a loan is made, provide reports to REA on its efforts to develop and carry out a systemwide program of energy conservation and management for its consumers or member-owners.

RURAL ELECTRIC SYSTEMS OFFER CONSERVATION AIDS

These include, but are not limited to, home weatherization programs of advice, education and financial assistance to consumers as well as other programs of information and education which will aid the consumer in making more effective and efficient use of energy in the home. Similar programs for farm operations, such as irrigation and crop-drying, and more efficient use of electric motors, for example, are also part of the system-wide approach. REA requires that these activities be reported and that there are adequate management resources developed by the borrowers to conduct these activities through work-plans, budgets and reports of actual staff time and funds expended by the local rural electric system.

This policy, stated formally in REA Bulletin 20-2, was initiated in January of 1979. It represented about 12 months of prior development, during which time REA worked with about 150 local rural electric systems across the country, reviewing comments and suggestions they had offered us based upon their own conservation experience. There were a large number of systems which already had significant—and successful—energy conservation programs. In addition, REA analyzed the energy conservation programs of more than 250 electric utilities throughout the United States before final policy and implementation decisions were made. These special efforts were undertaken because it was necessary to develop workable and usable guidelines for rural utilities which operate across the United States under widely-varying conditions of climate and electric load patterns. During 1978 the agency prepared its own energy conservation handbook and in February of 1979, it was distributed to each of its borrowers. In addition, REA prepared guidelines and recommended procedures to accompany the handbook. It contains a wealth of prac-

tical aids and is based upon actual experience of successful energy conservation programs of REA-financed systems.

PROGRAM BEGAN WITHOUT MANDATORY CONTROLS

The REA Energy conservation program entered its active stage in January of 1979 when it was announced that loan applications received after July 31, 1979 required those reports I have just discussed with you. Although it was not required of REA borrowers, the majority of them began fulfilling these requirements as soon as it became necessary for them to make loan applications. Throughout 1979, as we analyzed these reports, we saw that the REA-financed systems were making a real effort to meet these requirements. These efforts were being waged before and in preparation for the full compliance stage, which went into effect on January 1 of this year.

In late 1979, REA cooperated with the national association of electric borrowers—NRECA—in developing a survey of local rural electric systems to get an understanding of the extent of the activity being carried out in the energy conservation area. Some of you may be familiar with the results of that survey, but I will reiterate here some of the high points:

734 systems have budgeted \$24,570,000 for 1980 energy conservation activities;

These systems indicated that more than 2 million employee hours will be devoted to energy conservation in 1980;

More than 800 rural electric personnel have received special training to provide consumer assistance in energy conservation.

In an ongoing concern for the President's energy conservation efforts and his directives to the Federal agencies to use existing authorities to achieve conservation, REA has proposed a program which will use its authority under Section 12 of the REA Act. This authority would enable borrowers to defer payment loan principal and use that money to make home weatherization loans to consumer-members. Under guidelines being prepared, early notes to REA would be deferred to make possible the use of loan funds administered by the cooperative at five percent interest to consumers. We believe that a large number of systems would exercise this option.

SECTION 12: A NEW APPLICATION FOR AN EXISTING AUTHORITY

As many of you are aware, Section 12 of the RE Act is to be exercised—and has been exercised in the past—only when economic conditions have warranted its use or when it has been instrumental of the realization of important and strategic national objectives. It is felt that the option of REA to defer principal payment to distribution systems to relend funds to member-consumers for home weatherization would accomplish the national purposes of energy conservation and the conservation of natural and capital resources. It also would reduce the need for a significant amount of electric generating capacity, as well as transmission and distribution facilities. The avoidance of the large investments required for developing such facilities would greatly benefit the rural systems in the future. This mechanism would aid in the energy conservation efforts rural Americans are beginning to achieve. Conservation efforts throughout rural America will help stem inflation. This effort also would focus the attention of rural systems upon applications of renewable and supplement forms of energy reproduction as part of our overall inventory of resources. We are convinced that this tool, in addition to other developments REA is planning, would, over the long-term, help this country achieve energy sufficiency and some measure of control over escalating costs.

In the area of developing additional sources of energy, REA sought the opinion of the Comptroller General regarding loan-making authorities. In an opinion dated February 15, 1980, the Comptroller General states that the REA Administrator has the authority to make loans for certain purposes associated with energy-producing projects including those for study of feasibility project-licensing and other early costs. REA expects to utilize this authority immediately in the development of supplemental sources of energy, such as low-head hydroelectric facilities, a source of energy in which a substantial number of our borrowers have expressed high interest. Until now, there has been reluctance on the part of these systems to proceed because it was not clear if REA could approve funds for these "front-end" purposes. Clarification of this authority reinforces the efforts which this agency has taken in the past two years to implement energy conservation and the development of supplemental sources through using existing authorities. In view of the Comptroller General's opinion, REA is preparing criteria under which it will make insured loan funds available to qualified borrowers for the initiation of studies leading to licensing of small hydroelectric projects. We intend to pursue the study of other utility

grade technologies in wind, solar and coal bed gas recovery as promising supplements to large-scale coal and nuclear power generation. In the reorganization of the REA Electric Program, I have created an Energy Management and Utilization Division to administer and promote the development of these resources.

REA's announced intention to use Section 12 for home weatherization and the intention to finance feasibility studies of low-head hydro projects were met with very enthusiastic responses by the delegates to the recent National Rural Electric Cooperative Association meeting in New Orleans. Resolutions supporting the proposals were passed by that group on March 6.

Proposed rules for implementing the Section 12 proposal were published in the Federal Register on April 18. The public comment period closes May 19 and we expect to make our decision on this program shortly thereafter.

DETERMINING EFFECTS OF CONSERVATION UPON GROWTH OF RURAL ELECTRIC SYSTEMS

What effect have REA conservation efforts had to date? As all of these activities progressed throughout 1979 and into the first months of 1980, it was necessary for REA to know whether or not conservation—and rising prices—were affecting energy sales of rural electric systems. Was energy conservation taking hold? If so, for what reasons? Was it price-induced? What were the effects of past seasons of relatively mild winters and summers upon electric load growth? How much could be attributed to conservation efforts of REA-financed systems and those of their consumer-owners?

Reports from 913 of the REA distribution borrowers yield the following results. Energy sales in 1979 were only 3.1 percent above the energy sales in 1978. This represents a dramatic decrease from the 6.3 percent growth level of energy sales of 1978 over 1977. This came about even though average use per residential consumer in 1979 was 1.9 percent less than in 1978. The net energy sales increase most probably resulted from the increase of consumers by approximately 300,000, or 3.7 percent of total consumers. The largest percentage increase in the number of consumers occurred in the commercial and industrial sector, a trend which has consistently help up over the last decade.

Attached is a state by state breakdown of the load growth statistics for 1979 energy sales.

ENERGY CONSERVATION: LONG-TERM, SHORT-TERM VALUES FOR RURAL SYSTEMS

In addressing the rural electric cooperative leadership at the NRECA annual meeting in New Orleans, I advised them of this reduction of electric energy sales, telling them that it was understood that this substantially reduced sales of energy created a quandary for them. It was stated that it is in the nature of energy conservation programs to have short-range impacts upon revenues. But it was emphasized that the long-term benefits of averting substantial capital outlays for new electric capacity would be a much greater gain for their future financial outlooks than the actual cost of conducting conservation programs or the short-term negative impact upon revenues.

SYSTEM NET BENEFIT

Conservation investments made by individual consumers not only benefit those consumers, but the utility system itself or, depending upon its ownership, the entire class of utility consumers. The system net benefit derives from the fact that there is a savings to a utility system resulting from a consumer conservation action when the conservation activity results in the utility not having to furnish a commodity (a kilowatt-hour) to sell at an average cost, which it must supply either by adding generating capacity or by purchase at the higher marginal cost to the utility. This system net benefit would not be present if electric power were sold at the marginal cost of obtaining new capacity, or if there were no utility load growth necessitating the building of new capacity.

For example, let's assume an electric utility sells energy at 3¢/kwh, yet the current cost of energy—with associated transmission, distribution and administrative expenses—is closer to 6¢/kwh—a not unreasonable assumption in today's world. If an average consumer reduces his demand by 5,000 kwh's per year, the current annual savings to the utility system is $5,000 \text{ kwh/yr.} \times 6¢/\text{kwh} = \$300/\text{yr.}$

The utility does, however, forego the collection of revenues from the consumer for the energy not used at current rates for costs of $5,000 \text{ kwh/yr.} \times 3¢/\text{kwh} = \$150/\text{yr.}$ The net benefit to the system is therefore: $\$300 - \$150 = \$150/\text{yr.}$

If there are no major expenses for the utility system in providing the conservation investment (other than overhead for promotional, educational or energy audit expenses) the system realizes the entire annual benefit of \$150/yr. For a consumer-

owned system this benefit would be reflected in electric rates lower than would have been charged had there not been this conservation investment.

FINANCIAL IMPLICATIONS OF ENERGY CONSERVATION

As I stated previously conservation practices by rural cooperative members will have a negative impact on system revenue, but will produce long-term benefits because the need for additional high cost new capacity will have been obviated.

It should be remembered that the continuing growth in the number of consumers on rural electric systems will mitigate the effects of reduced consumption by the present consumers.

The overall impact of conservation practices on the future financial needs of REA generation and transmission borrowers is illustrated in Table I. The figures shown in Table I are illustrated graphically in Exhibit 2 and 3. As can be seen, the percentage total of REA borrower power supply needs met by self-generation shows a steady increase during the decade of the 80's. The amount of additional MW of capacity and the resulting cost varies dramatically depending upon the percentage increase in annual load growth.

For example, with a 1 percent annual load growth a total of about 7,000 MW of capacity, at a cost of \$10.5 billion (1980 dollars), will be required. If, however, the annual load growth were 9 percent, almost 58,000 MW of capacity, at a cost of almost \$87 billion (1980 dollars), will be required. In all likelihood, the actual load growth through this period will be in the middle of these two extremes. This indicates the importance of an effective conservation program to reduce load growth. The costs involved in the Section 12 deferment program are miniscule as compared to the reduction in credit needs that result from an aggressive conservation program.

RURAL AMERICA AND RURAL ELECTRICS WILL CONTRIBUTE TO SECURE ENERGY FUTURE

I also informed NRECA members that should conservation efforts seriously affect their earnings, that I was prepared to use Section 12 of the Rural Electrification Act to delay principal payments in order to relieve a serious financial crunch of any borrower-system.

Energy conservation and the prospects of developing renewable and supplemental sources of energy in rural areas is a high priority of REA and its borrowers. It is viewed by this agency as an opportunity to serve rural people in difficult times. We will carry out our responsibility under the Rural Electrification Act to assure rural America of central station electric power; we will carry out that responsibility with attention to all viable potentials for energy conservation and development of domestic energy resources. REA and the rural electric systems are ready to demonstrate their abilities to help make the energy future of this nation secure.

I believe there is in the American farmer and rancher—in the rural American experience—not only the conservation ethic, but also the will to make the best use of available resources. There exists in rural America a vast variety of opportunities to pioneer in new energy technologies, an opportunity that is not always abundant in the Nation's metropolitan centers. I believe REA and its borrowers, the partnership which makes up the national program of rural electrification, is well on its way in this partnership arrangement to provide important leadership and new pathways in America's quest to achieve energy sufficiency at reasonable cost.

TABLE 1

BULK POWER SUPPLY FACILITIES FOR WHICH FINANCING WILL
BE REQUIRED BY REA BORROWERS

Annual Load Growth, 1980-89	Percent of Total REA Borrower Needs Supplied by Borrower's Own Generation		MW of Additional Capacity Financed		Billion Dollars of Financing Required			
	1980	1989	Annual Average		Constant (1980) \$ 3/		Nominal \$ 4/	
			Total 1980-89	1980-84 Annual Average 1985-89	Total 1980-89	Annual Average 1980-84 1985-89	Total 1980-89	Annual Average 1980-84 1985-89
1%	36.0	51.7	6,989	835	563			
2%	36.0	52.5	9,937	1,081	906			
3%	36.0	53.7	13,796	1,393	1,366			
4%	36.0	54.4	18,518	1,759	1,944			
5%	36.0	55.8	30,572	2,638	3,477			
6%	36.0	57.2	46,631	3,759	5,567			
7%	36.0	57.8	57,830	4,446	7,120			
					\$10.5	\$ 1.3	\$14.6	\$ 1.5
					14.9	1.6	21.2	1.9
					20.7	2.1	29.9	2.5
					27.8	2.6	40.6	3.1
					45.9	4.0	68.2	4.6
					69.9	5.6	105.1	6.6
					86.7	6.7	131.2	7.8
								18.4

Assumptions: 1/ REA's best judgement concerning source of future power supply for REA borrowers.

2/ 50% load factor; a four year lead time between loan approval and on line dates; reserves equal 20% of required capacity.

3/ 1980 cost per MW of \$1,200 plus financing for bulk transmission facilities in an amount equal to 25% of generating plant investment.

4/ Constant (1980) \$ inflated at an annual rate of 8%.

Note: MW = one thousand Kilowatts of capacity.

Appendix

REA DISTRIBUTION BORROWERS - ESTIMATE OF % CHANGE IN MWH SALES - 1979* EXHIBIT 1

		1979	1978	% Change in Sales from 1978 to 1979	% Change in Sales from 1973 to 1978
	No. of Systems Incl.	MWH Sales	MWH Sales		
UNITED STATES	913	135,563,137	131,431,164	3.1	
Alabama	23	4,486,235	4,624,816	-3.0	5.7
Alaska	12	1,741,420	1,678,991	3.7	11.7
Arizona	9	1,888,912	1,456,987	29.6	8.4
Arkansas	18	3,259,543	3,205,855	1.7	8.6
California	3	170,543	142,335	19.8	-2.0
Colorado	22	3,682,294	3,561,538	3.4	14.2
Connecticut					
Delaware	1	278,777	281,483	-1.0	6.9
Florida	15	4,187,022	3,997,326	4.7	8.5
Georgia	42	7,365,813	7,239,462	1.7	6.3
Hawaii					
Idaho	8	757,301	669,286	13.2	9.4
Illinois	27	3,002,724	2,920,295	2.8	7.2
Indiana	41	4,551,208	4,361,510	4.3	7.9
Iowa	47	2,732,504	2,584,895	5.7	6.4
Kansas	35	2,234,621	2,225,136	0.4	7.6
Kentucky	26	12,308,051	11,731,781	4.9	6.3
Louisiana	13	3,551,913	3,370,925	5.4	8.9
Maine	3	78,729	79,264	-0.7	10.8
Maryland	2	1,259,223	1,226,187	2.7	6.8
Massachusetts					
Michigan	13	1,277,981	1,243,708	2.8	5.1
Minnesota	49	5,368,663	5,054,201	6.2	8.0
Mississippi	24	6,175,100	6,142,283	0.5	6.7
Missouri	41	4,869,515	5,023,958	-3.1	8.8
Montana	23	1,347,829	1,230,535	9.5	7.4
Nebraska	32	2,602,767	2,594,996	0.3	6.8
Nevada	6	325,589	323,071	0.8	8.0
New Hampshire	1	325,500	316,748	2.8	5.3
New Jersey	1	68,361	63,001	8.5	9.8
New Mexico	15	1,718,679	1,638,519	4.9	11.3
New York	4	106,389	104,997	1.3	8.3
North Carolina	28	4,736,307	4,665,894	1.5	7.2
North Dakota	21	2,069,190	1,890,492	9.5	8.5
Ohio	27	3,091,569	3,069,478	0.7	7.2
Oklahoma	27	4,174,155	4,135,859	0.9	9.2
Oregon	14	2,686,495	2,357,424	14.0	8.4
Pennsylvania	12	1,398,818	1,359,622	2.9	6.4
Rhode Island					
South Carolina	20	3,755,283	3,670,468	2.3	10.3
South Dakota	32	1,708,529	1,611,765	6.0	9.2
Tennessee	24	10,809,015	10,912,852	-1.0	4.8
Texas	73	9,052,688	9,042,020	0.1	8.7
Utah	4	842,082	772,545	9.0	15.2
Vermont	2	135,834	135,955	-0.1	1.1
Virginia	15	3,019,520	2,896,388	4.3	6.9
Washington	15	2,466,795	2,185,763	12.9	8.7
West Virginia	1	25,755	23,546	9.4	5.9
Wisconsin	28	1,781,286	1,702,459	4.6	6.2
Wyoming	14	2,086,603	1,904,545	9.6	9.6
Puerto Rico					

*NOTE: These estimates are still considered preliminary since they are based on unedited reports received from REA borrowers and do not include data for

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*about 20 systems.

REA DISTRIBUTION BORROWERS

EXHIBIT 1a

ESTIMATE* OF % CHANGE IN MWH SALES - 1979

TOTAL U.S. = 3.1%



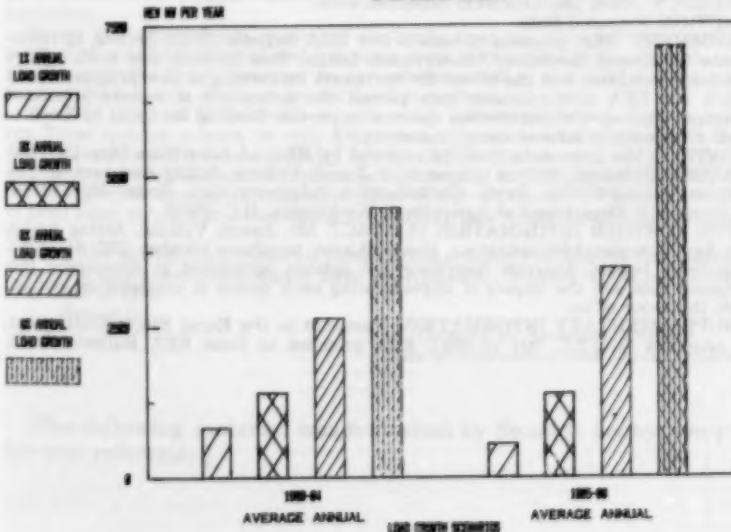
- Represents an Increase in Sales of 3.1% or less.
 Represents an Increase in Sales Greater than 3.1%.
 Represents States Not Served by REA Borrowers.

* See Attached Table

EXHIBIT 2

PROJECTED GENERATING CAPACITY FINANCED

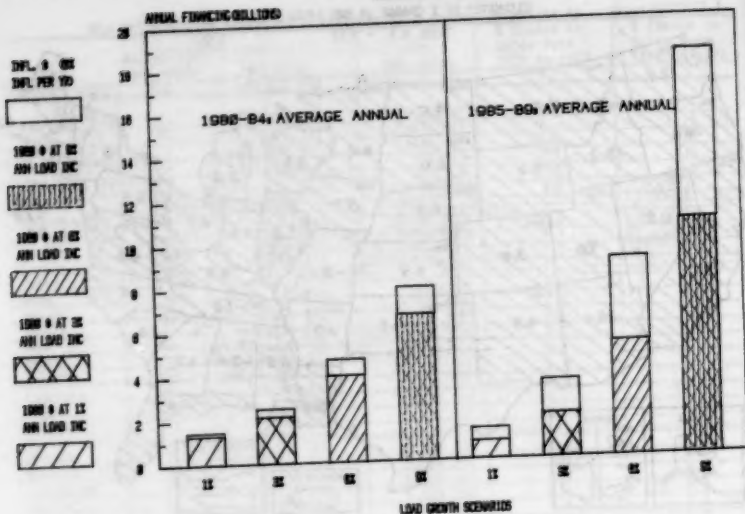
BY REA ELECTRIC BORROWERS



NOTE: REA ASSUMPTIONS LISTED ON ACCOMPANYING TABLE

ANNUAL POWER SUPPLY FINANCING

REQUIRED BY REA BORROWERS



NOTE: SEE ASSUMPTIONS LISTED ON ACCOMPANYING TABLE

[EXHIBIT 4]

[From the Federal Register, vol. 45, No. 77, Friday, Apr. 18, 1980]

RURAL ELECTRIFICATION ADMINISTRATION—7 CFR PART 1701—PROPOSED REA PROGRAM TO PERMIT DEFERMENT OF PRINCIPAL REPAYMENT TO ACHIEVE CONSERVATION

AGENCY: Rural Electrification Administration.

ACTION: Proposed Rule.

SUMMARY: REA proposes to issue a new REA Bulletin 20-23, Section 12 Deferrals for Energy Resources Conservation Loans. This bulletin sets forth agency policies, procedures and guidelines for borrowers concerning a new program under which the REA Administrator may permit the deferment of certain scheduled principal payments of distribution systems to provide funding for loans by them to their consumers to achieve energy conservation.

DATE: Public comments must be received by REA no later than May 19, 1980.

ADDRESS: Submit written comments to Joseph Vellone, Acting Assistant Administrator-Administration, Rural Electrification Administration, Room 4063, South Building, U.S. Department of Agriculture, Washington, D.C. 20250.

FOR FURTHER INFORMATION CONTACT: Mr. Joseph Vellone, Acting Assistant Administrator-Administration, above address, telephone number (202) 447-3863. The Draft Impact Analysis describing the options considered in developing this proposed rule and the impact of implementing each option is available on request from the above office.

SUPPLEMENTARY INFORMATION: Pursuant to the Rural Electrification Act, as amended (7 U.S.C. 901 et seq.), REA proposes to issue REA Bulletin 20-23,

Section 12 Deferments for Energy Resources Conservation Loans. This proposed action has been reviewed under USDA procedures established in Secretary's Memorandum No. 1955 to implement Executive Order No. 12044, and has been classified not significant.

REA, in its effort to further the national goals of energy conservation and the conservation of natural and capital resources, as set forth in the National Energy Conservation Policy Act of 1978, Executive Order No. 12185 issued December 17, 1979, and other laws and regulations, is proposing the use of existing authorities under Section 12 of the Rural Electrification Act of 1936, to defer certain principal payments at the request of distribution systems to provide funds which they can then use to make loans to their consumers for energy conservation purposes. It will provide such borrowers with an opportunity to augment their present energy conservation programs by making funds available for a consumer loan program to finance such items as attic and floor insulation, storm windows and doors, air infiltration reduction, caulking, water heater insulation, and weatherstripping.

Copies of the draft bulletin are being sent directly to all REA electric borrowers. Copies are also available upon request from the address indicated above. All written submissions made pursuant to this action will be made available for public inspection during regular business hours, address above.

Dated: April 11, 1980.

ROBERT W. FERAGEN, *Administrator*.

[FR Doc. 80-11553 Filed 4-17-80; 8:45 am] Billing Code 3410-15-M

U.S. DEPARTMENT OF AGRICULTURE,
RURAL ELECTRIFICATION ADMINISTRATION,
Washington, D.C., May 7, 1980.

Mr. JAMES GILTMIER,
*Professional Staff Member, Senate Agriculture, Nutrition, and Forestry Committee,
Russell Senate Office Building, Washington, D.C.*

DEAR MR. GILTMIER: This is in response to your question about the 1979 load growth of REA borrowers in Arizona and California.

The high growth rate (29.6 percent) in Arizona was due to a large increase in energy sold to copper mines by two cooperatives located in southwest Arizona. If these loads are removed from the State totals, its 1979 growth rate in kilowatthour sales becomes 2.5 percent—below the national rate of 3.1 percent for all REA borrowers.

During 1979 the average amount of electricity used per consumer decreased for residential, small commercial and irrigation consumers served by the Arizona rural electric systems. These decreases in per consumer usage also held for the rural electric program as a whole, as we discussed yesterday.

The REA program in California is quite small; serving only about 12,000 consumers. These systems account for only 0.3 percent of total electricity sold in the State and 0.4 percent of the total electricity sold by all REA borrowers. Irrigation sales by REA borrowers in California increased by 36.3 percent in 1979, accounting for 9.4 of the 19.8 percent increase in total sales. Most of the remaining 10.4 percent increase in total sales was due to a strong (6.8 percent) increase in the number of consumers served.

One other matter that should be noted is that column 5 of Exhibit 1 to Administrator Feragen's testimony should have been labeled, "Annual % Change in Sales from 1973 to 1978."

Sincerely,

HARLAN M. SEVERSON, *Director,
Office of Information and Public Affairs.*

[The following material was furnished by Senator Leahy; see p. 8 for oral reference.]

(From the Congressional Record, May 6, 1980)

STATEMENTS ON INTRODUCED BILLS AND JOINT RESOLUTIONS

By Mr. LEAHY:
S. 2658. A bill to establish a rural weatherization grant program within the Department of Agriculture; to the Committee on Agriculture, Nutrition, and Forestry.

RURAL AREAS AND SMALL CITIES ENERGY SAVINGS ACT OF 1980

Mr. LEAHY. Mr. President, energy experts rarely agree on anything. Their analysis of past energy problems and their projections for the future are seldom consistent and vary like the weather.

However, there is one basic fact on which there is a consensus. Energy pundits from all persuasions agree that the most viable and realistic method of reducing America's energy consumption immediately is through conservation. The only real choice we have for reducing our oil imports significantly over the next decade is to use less energy. It is that simple.

Various methods for reducing energy consumption are now either in debate or effect, including higher prices, the 55-mile-per-hour speed limit, and gas rationing. The legislation I introduce today will strengthen an equally effective yet less painful method of saving energy, the weatherization of homes. Adequate insulation can reduce home energy consumption by 20 to 30 percent.

The benefits of this bill are targeted to nonmetropolitan areas where half of the Nation's substandard housing is found. Through the insulation of the homes of the elderly, the handicapped, and the low-income, the Rural Areas and Small Cities Energy Savings Act will lower the fuel bills of those most in need and insure a more stable delivery of energy resources to the peoples of rural America living at the end of the energy pipeline.

The 60 million people of small town America need a weatherization program tailored to their circumstances and strengths. This bill does that by relying on the county based Farmers Home Administration, the community minded rural electric cooperatives, and the historic ability of rural Americans to join together to help themselves.

Mr. President, hearings before the Rural Development Subcommittee, the Energy Committee, the Labor and Human Resources Committee, and the Appropriations Committee have found current Federal weatherization programs to be ill-conceived, ineffective, and inefficient.

Appropriations for the DOE weatherization assistance program for fiscal years 1977 through 1980 total \$490.5 million. As of the start of fiscal year 1980 only 20 percent of this money had been spent. The remainder, some \$400 million, has sat dormant saving no energy and assisting no one.

The DOE program has weatherized 240,000 homes but is operating at less than 20 percent of the potential promised. One of its problems has been solved by allowing the hiring of non-CETA labor. However, this program alone will not provide sufficient home weatherization service in the short term. Although it has managed to weatherize a few more homes each year, the percentage of new homes weatherized is actually declining.

Finally, the fate of this DOE program is uncertain as the Senate recently voted overwhelmingly to create an expanded comparable program in the Community Services Administration. Yet, the final arbitration of whether DOE gets the program or CSA gets it back lies with the Appropriations Committee.

Mr. President, the weatherization program launched by the Department of Agriculture in 1977 is foundering. Designed to couple the community linkages and managerial resources of a rural electric cooperative with the financial resources of the Farmers Home Administration, it has suffered a stillbirth.

Over the last 3 years this program has only insulated 1,309 homes and spent \$1.2 million in loans.

USDA's weatherization program does not work because it depends on loans targeted to the elderly, the handicapped and the low-income. These people are not in a position to even consider taking a loan regardless of the interest rate. First these people must buy food and heat their homes before they can think about a loan for anything. And with prices what they are, these people do not give much thought to loans for weatherization. They cannot afford to. The Federal Government cannot afford to ignore their needs if home energy is going to be saved.

The USDA program foundered because it gave rural electric cooperatives or community based organizations no incentive to participate. It was a poorly conceived plan from the start. The recent effort to allow deferment of REA loan payments to help salvage this weatherization program is a weak remedy.

The USDA weatherization program is a pitiful effort. To think that the combined efforts of the REA which has loaned over \$30 billion since 1936, and the FmHA with a current portfolio in excess of \$50 billion, is doing an adequate job by weatherizing 1,309 homes over 3 years is a heartless joke. It is a sarcastic approach to the real and present danger this country is in until we can reduce energy consumption.

The USDA weatherization program though a failure does have one thing right. It has recognized that in order to have a successful rural weatherization program you must rely on rural electric cooperatives. These cooperatives number over 1,000 with an average membership of 8,000 and serve over 25 million customers. They directly touch the lives of half of nonmetropolitan America.

Rural electric cooperatives brought electricity to the farms and modern plumbing to rural homes. These cooperatives helped to stem the massive migration to the big cities. Through this legislation they can help make this Nation and the people they serve energy independent.

Mr. President, I am introducing the Rural Areas and Small Cities Energy Savings Act of 1980 to save energy in those nonmetropolitan households most in need of assistance. The following is a brief summary of how this legislation would operate. Further details can be gleaned from the bill itself which immediately follows my remarks.

Under the legislation electric cooperatives and community based organizations would conduct energy audits of elderly, handicapped and low-income households outside of standard metropolitan statistical areas. Following the audits, the cooperatives and the organization would apply to FmHA for grant funds to weatherize eligible households they have audited. A \$50 million grant fund would be created at FmHA for this purpose.

The cooperatives and organizations could each then pool the grants received from FmHA to weatherize eligible homes. These funds would be used to buy materials in bulk and hire contractors and necessary labor to insulate homes.

To defray costs, participating rural electric cooperatives and community based organizations could retain up to 7 percent of the grants they received from FmHA. Hearing testimony has shown that rural electric cooperatives do not participate in the current USDA weatherization program because they are not reimbursed for administrative costs they would incur. The Rural Areas and Small Cities Energy Savings Act provides a significant incentive for their active participation while insuring that the venture is worthwhile.

The program established by this legislation would be a good beginning to bring energy conservation to rural and small city America, while also serving the twin goals of decent housing and lower fuel bills.

Hearing dates on this legislation will be announced by the Rural Development Subcommittee of the Committee on Agriculture, Nutrition, and Forestry in the near future. Anyone with inquiries on the Rural Areas and Small Cities Energy Savings Act of 1980 should contact Ken Pierce of my staff at 224-4242.

Mr. President, I ask unanimous consent that the text of the Rural Areas and Small Cities Energy Savings Act of 1980 be printed in the Record.

There being no objection, the bill was ordered to be printed in the Record, as follows:

S. 2658

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act may be cited as the "Rural Areas and Small Cities Energy Savings Act of 1980."

SEC. 2. Section 310B of the Consolidated Farm and Rural Development Act is amended by adding at the end thereof a new subsection (e) as follows:

"(e)(1) The Secretary shall develop and conduct a weatherization program for the purpose of making grants to finance the purchase or installation, or both, of weatherization materials in dwelling units occupied by low-income persons and families in rural areas. To the maximum extent practicable, grants under this subsection shall be devoted to weatherization work administered by rural electric cooperatives or, in any county where such a cooperative is not available, or an available cooperative does not participate in the program, a non-profit community based organization selected by the Secretary. Grants under this subsection are for the purpose of conducting weatherization projects on dwelling units owned by low-income persons and families in rural areas or, subject to the provisions of paragraph (5) of this subsection, low-income rental dwelling units for the benefit of low-income tenants living therein. Grants for the weatherization work performed under this subsection shall be made to the rural electric cooperatives and non-profit community based organizations participating in the program.

"(2) In making grants under this subsection, the Secretary shall give priority to the weatherization of dwelling units occupied by low-income elderly or handicapped persons.

"(3) The Secretary shall, in carrying out this subsection, consult with the Director of the Community Services Administration and the Secretary of Energy for the purpose of coordinating, to the maximum extent practicable, the weatherization programs conducted under this subsection, section 222(a)(12) of this Economic Opportunity Act of 1964, and part A of the Energy Conservation in Existing Buildings Act of 1976.

"(4) No grant under this subsection for the weatherization of any dwelling unit may exceed \$1,500, including labor, materials, and administrative costs.

"(5) In making a grant under this subsection to finance the weatherization of a rental dwelling unit, the Secretary shall provide that (A) the benefits of weatherization assistance in connection with such unit shall accrue primarily to the low-income persons or family residing therein, (B) the rent on such dwelling unit will not be raised because of any increase in value thereof due solely to weatherization assistance provided under this subsection, and (C) no undue or excessive enhancement will occur to the value of such unit.

"(6) Rural electric cooperatives and nonprofit community based organizations administering weatherization projects financed by grants authorized under this subsection first apply to and be approved by the Secretary for participation in the program. Rural electric cooperatives and non-profit community based organizations participating in the program authorized by this subsection shall conduct energy audits of dwelling units eligible for participation in the program as defined by paragraphs (12) and (13) of this section.

"(7) Rural electric cooperatives and non-profit community based organizations participating in the program authorized by this subsection shall, following the completion of no less than ten energy audits conducted under paragraph (6) of this section, submit an application to the Farmers Home Administration for grant funds authorized by this subsection to carry out necessary weatherization projects based upon those completed energy audits.

"(8) Rural electric cooperatives and non-profit community based organizations participating in the program authorized by this subsection may, on an individual basis, pool the grant funds they receive from the Farmers Home Administration to conduct the necessary weatherization work on homes having received an energy audit under paragraph (6) of this subsection. These pooled funds shall be used to finance the purchase and installation of weatherization materials used to carry out projects authorized by this subsection, and, subject to the limitation contained in paragraph (10) of this subsection, the administrative expenses incurred by rural electric cooperatives and non-profit community based organizations participating in the program.

"(9) Rural electric cooperatives and non-profit community based organizations participating in the program authorized by this subsection shall hire persons to perform the installation of weatherization materials on projects conducted under this subsection. However, rural electric cooperatives and non-profit community based organizations participating in the program authorized by this subsection may use volunteers and training participants and public service employment workers, assisted under the Comprehensive Employment and Training Act of 1973 or the Older American Community Employment Act, to perform the labor in conjunction with weatherization projects conducted under this subsection.

"(10) For their administration expenses, rural electric cooperatives and non-profit community based organizations participating in the program authorized by this subsection shall not be entitled to more than 7 percent of the total amount of the grants made to them.

"(11) The Secretary shall carry out the program authorized by this subsection in accordance with the weatherization standards described in paragraphs (2)(A) and (3) of section 413(b) of the Energy Conservation in Existing Buildings Act of 1976.

"(12) For purposes of this subsection, the terms "elderly," "handicapped person," "low-income," and "weatherization materials" shall have the same meanings given those terms in paragraphs (3), (5), (7) and (9) respectively, of Section 412 of the Energy Conservation in Existing Buildings Act of 1976.

"(13) For purposes of this subsection, the term "rural areas" means those areas not within a Standard Metropolitan Statistical Area as defined by the Bureau of the Census.

"(14) There are authorized to be appropriated for each of the fiscal years ending September 30, 1981, September 30, 1982, September 30, 1983, September 30, 1984, and September 30, 1985, \$50,000,000 for making grants under this subsection."

STATEMENT OF ROBERT D. PARTRIDGE, EXECUTIVE VICE PRESIDENT, NATIONAL
RURAL ELECTRIC COOPERATIVE ASSOCIATION

Mr. Chairman and members of the Committee, my name is Robert D. Partridge. I am executive vice president of the National Rural Electric Cooperative Association, the national service organization of nearly 1,000 rural electric systems operating in 46 states. These systems provide central station electric service to about 25-million rural people in 2,600 of the nation's 3,100 counties.

With me this morning is the chairman of NRECA's special committee on energy conservation, Dean Searls, who is manager of Adams Electrical Cooperative in Illinois and an acknowledged leader in the development of energy conservation programs.

Mr. Chairman, I would like to begin this morning by pointing out to the committee that there are no quick and easy solutions to the energy problems which face our country. We must recognize that conservation is just one tool we have to help us overcome these problems.

In March, I testified on the energy conservation activities of rural electric systems before a House Subcommittee. Several witnesses at that hearing expressed their beliefs that because rural electric power supply cooperatives are continuing to build generating plants they are demonstrating a lack of interest in conservation, load control and the development of supplemental or alternative energy sources. Further, these witnesses seemed to feel there would be no need for more central generating plants if we would only place a wind or solar generator on every farm or rural home.

Let me briefly comment on these views.

Rural electric systems have been at the forefront of the industry in all of these activities. They have been and are fully considering conservation, load control, and supplemental and alternative energy sources in their long-range planning. Others who will be testifying today will no doubt report on the extensiveness of their efforts in these areas.

Further, as anyone who has read recent news reports knows, while there are many experimental projects underway, the fact is that many wind and solar power systems are not only extremely costly, their reliability has yet to be proven. And there are serious unresolved technical and safety problems relating to integrating on-site small generators into a central-station grid system.

NRECA is just starting a research project which we hope will resolve some of these problems and find ways to improve the economic feasibility of such interconnection arrangements. But, as I said at the outset, there are no quick and easy solutions.

During those same House hearings, the Administrator of the Rural Electrification Administration cited preliminary figures which indicated that the growth rate for all rural electric distribution co-ops for 1979 is likely to be less than three percent—a dramatic drop from even recent trends.

As the Administrator Fergan pointed out, there are a number of factors which no doubt contributed to this reduction, including mild weather in many areas during 1979, but there are indications that conservation by rural electric and their consumers is having a significant impact.

However, this decline in the growth rate to three percent was characterized by some witnesses as "not good enough." Perhaps in the eyes of some it is not. But I would not want to mislead anyone into believing that the growth rate of electric usage by rural people is going to continue to show significant declines.

Besides recognizing that our rural areas continue to gain in population, we must keep in mind that the major efforts of conservation are aimed at conserving oil and gas. This means that electricity generated by hydroelectric dams, coal-fired plants and nuclear reactors not only is relatively plentiful, but use of it in place of oil or gas is also in the national interest.

We are already seeing signs that a significant number of Americans are increasingly relying on electricity as the primary source of energy in their homes and places of work. We expect this trend to continue in the decades immediately ahead.

The simple fact is that as America shifts from an economy based on oil and gas to one based on other energy forms, it is inevitable that the use of electricity generated by these other energy forms will increase rather than decrease.

Consequently, in the long run we will have to place more, not less, reliance on central-station generating capacity. In this connection, I have attached to this statement the report of an NRECA and National Rural Utilities Cooperative Finance Corporation committee on the future financing of power supply for rural electrification. This report outlines in detail the conclusions of this blue-ribbon group.

Mr. Chairman, rural people have traditionally been conservation minded, a fact that has made rural electric directors and managers deeply aware of the need for efficient use of our energy resources.

At the same time, these rural electric leaders continue to recognize their prime obligation to provide their consumer-members with an adequate and reliable supply of electric energy at the lowest possible cost.

At the close of 1979, NRECA surveyed its 908 distribution-type members to determine the extent of their involvement in energy conservation, load control and alternative or supplemental energy programs.

A copy of the complete survey results as well as a press release summarizing it are attached to my statements. I will therefore not take the time to review it, except to say we believe it clearly reveals a growing commitment by the rural electrification program to conservation and the wise use of our nation's energy resources. It also shows that rural electricians are leaders in projects involving supplemental or alternative energy sources. (A partial listing of projects such as these is attached to this statement.)

At the same time, the survey showed that there are difficulties.

NRECA's special Energy Conservation Committee, appointed early in 1977 and now chaired by Mr. Searls, met and reviewed the findings early this year.

While the committee was encouraged by the growing commitment to energy conservation, it cited a number of factors it believes are inhibiting many systems in the development of strong, concrete energy conservation programs.

In addition to the fear that a maximum conservation effort might substantially increase unit costs and force retail rate increases, the committee cited these problems:

- *A need for financial and staff resources to conduct such a program.

- *A lack of knowledge about how to develop a strong, effective program.

- *The need for effective consumer education programs.

Other factors which seem to be holding back conservation program development are anticipated consumer criticism for committing additional resources in a time of rising rates, the lack of trained personnel and the uncertainty over state and federal regulatory requirements.

It has become increasingly apparent that while rural electric systems are moving to help their consumers save energy, they do face serious problems in doing so.

In the face of spiraling costs on all fronts, they are especially concerned about the possible impact of energy conservation on their revenues. As it has been put, "We can't afford to conserve ourselves out of business."

Let me review with you briefly some of the implications of conservation to the distribution cooperative—bearing in mind they all have certain fixed costs, including loans to be repaid, which must be met.

An electric utility must build its system to meet the demands of each individual consumer as well as the total demand of all of them. Each rural home or business has, for instance, a transformer sized to meet its expected needs, and distribution and transmission lines are built to meet total expected demand. Further, generating capacity, whether provided by a generation and transmission cooperative or purchased elsewhere, must be sufficient to meet total demand at any given moment.

Typically, the demand for power on a rural system that is, one without a heavy concentration of industrial or commercial users—begins rising in the morning and peaks about the time the working days begins, then gradually declines until the evening hours, when it rises to a still higher daily peak and again drops off at bedtime.

In addition to these daily demands, there is a seasonal demand peak for each system, with those in the north usually experiencing their highest annual usage during the winter months and those in the south having their highest usage sometime in the summer. This peak is the one that determines how much generating capacity is needed and, in turn, the demand charge that determines wholesale power rates.

Conservation efforts by an individual consumer do result in fewer kilowatt-hours being used. It is, of course, true that each kilowatt-hour conserved is energy saved and, hence, in the national interest. Too often, however, this energy is saved in off-peak periods. A conservation-minded person, for example, might make sure all lights and appliances are off when leaving the house during the day, but he or she gives little thought to saving electricity while cooking or washing clothes in the early evening, when residential peaks usually occur.

The result is not a lessening of demand which might allow the less investment per consumer, postponement of physical plant additions or reduced wholesale costs, but simply fewer dollars coming in to meet the fixed costs of the plant already in place.

If there is not enough revenue to meet fixed costs, the unfortunate result is higher rates. The irony to the consumer is that the more electricity he saves, the higher the unit cost will eventually be.

In early March our membership met in New Orleans to develop policy for our Association for the coming year. High on the agenda at that meeting was an in-depth review of our energy conservation activities and consideration of recommendations to reinforce those activities.

A resolution developed jointly by five of our membership standing committees was later unanimously adopted by delegates at our business session. A copy of this resolution is attached to my statement.

In the resolution, our membership pledged its continued efforts in energy conservation and urged "all segments of our program to give highest priority to the development and implementation of programs designed to assist member cooperatives eliminate waste and improve efficiency." It also urged "each cooperative to increase its commitment of resources to assist its members in recognizing the need for establishing and implementing effective energy conservation programs."

At the same time, the resolution recognized the financial and staff limitations facing many systems as they develop their own programs to assist members, and that incentives for the consumer may not be sufficient to bring into being the kind of total commitment to conservation that is so vital in meeting the challenges of the 1980s.

It recommended that the Congress "consider the unique elements of the rural electrification program and its excellent working relationship with the Rural Electrification Administration and enact an energy conservation program tailored especially to the operating characteristics of REA borrowers. Such a program should be designed to provide these systems with a package of tools they can use in developing effective energy conservation programs and to provide them with assurances their financial integrity will not be eroded."

Specifically, the resolution called on Congress to consider five points, which I would like to review with the Subcommittee.

LOW-INTEREST CONSERVATION LOANS

First, the resolution called for authorization of a low-interest rate loan program to provide for purchase and installation of weatherization and other conservation materials and equipment, and for load-control, heat-storage or other devices or equipment to conserve energy on the consumer's premises.

The REA Administrator announced, even before adoption of this resolution, that his agency—acting under authorities in Section 12 of the Rural Electrification Act—is now prepared to defer principal payments for any borrower willing to dedicate these funds to low-interest loans to consumers for weatherization activities.

Information relating to this program has now gone to all REA borrowers for their comment and REA expects to finalize procedures for this program shortly.

Mr. Chairman, I want to commend Administrator Feragen and his staff for their initiative in developing this program and structuring it in a way which will make it relatively easy to administer. We at NRECA pledge our full support and cooperation toward making this program a success. We believe it will be a significant source of weatherization loan funds for rural electric consumers.

We recognize, as does the Administrator, that this program will not provide loans for other important energy conservation activities, such as the replacement of inefficient electric appliances with more efficient ones. An expanded program such as this would, of course, require considerable additional money and could have a detrimental impact on the REA revolving fund. Therefore, it may eventually become necessary to develop new authorities of funding to provide loans for these activities. We will continue to explore with REA feasible ways of developing such a program.

GRANTS FOR TESTS AND DEMONSTRATIONS

Secondly, the resolution called for a program to make it possible for REA to funnel grants, either from funds appropriated for this purpose or provided through programs of other agencies, to its borrowers or associations of borrowers for testing and demonstrating supplemental or alternative energy technologies. Such projects as wind, solar, biomass, methanol, methane, gasohol, heat recovery systems, load-control devices and lowhead hydro were mentioned.

Few rural electric systems have the expertise necessary to become grantsmen and most are overwhelmed by red tape when they try to effectively use other Federal resources to aid their members with energy conservation or alternative energy projects.

One frustration we have is that many Department of Energy programs are either set up or administered so that funds are channeled through agencies of state or local governments. Consequently, NRECA and REA have had little or no opportunity to involve rural electricians in DOE projects, and, at the local level, systems have little chance to participate in them.

On the other hand, the systems can and do work effectively with REA, which recognizes that they are local, responsible businesses and allows them to operate with relatively little interference. In short, REA expects them to operate in a prudent manner and more than 45 years of experience has shown they do just that.

Section 2053 of Title II of the Energy Security Act [S. 932], now pending before the Congress, would provide the kind of program most suitable to the needs and operating characteristics of our rural electric systems. This section authorizes the REA administrator to make grants to borrowers or federations of borrowers for projects that use alternative energy and energy conservation technologies. We support passage of this legislation. In particular, we look to a program of this type to help evaluate the impact of various new technologies on the operating characteristics of our systems, and to determine the most effective ways of conserving energy while protecting our financial integrity.

Meanwhile, we are pleased to learn that REA and DOE are discussing possible ways they can work together to effectively use the rural electrification program in developing or testing new technologies.

Mr. Chairman, I want to point out that NRECA itself has sponsored and funded a number of research and development projects involving load management and energy conservation.

One project in particular has tremendous energy conservation potential. NRECA funded the construction of a prototype electric heat-pump water heater which will heat water at less than half the energy and cost of a typical electric water heater. Subsequently, DOE carried the project forward so that now 200 units are being field tested throughout the nation, and the project is now nearing the commercialization stage.

Other projects we have sponsored or funded include: solar crop drying; a study on innovative, economical ways to reduce heat loss and gain in mobile homes; evaluation of infrared thermographic equipment for sensing residential heat losses; and a study involving the use of enzymes to break down cellulose in farm wastes for fuel production.

In addition, NRECA has been involved in such projects as these: an irrigation load management study which has resulted in use of less water and less electricity, with much of the energy use shifted to off-peak periods; an off-peak heating and cooling demonstration involving use of a heat pump; a new concept in metering electricity where conservation is encouraged and energy costs reduced with a solid state meter which requires consumers to buy electricity (like gasoline), in advance of its use; and a study on diversity of energy use with an interconnect device which prevents two or more high usage electric appliances from operating at the same time.

REA STAFFING FOR ENERGY CONSERVATION

Thirdly, the resolution asks for additional REA staff on a regional or state basis to provide assistance and encouragement to borrowers in the development of energy conservation programs and to assist them in meeting financial or other difficulties encountered with these programs.

REA was at the forefront of the development of many of our cooperatives during their formative years. Then the objective was to increase power use, not the conservation of energy. REA experts in wiring, in lighting, in irrigation, in heating, in dairying, in cooking and laundering fanned out over the countryside, preaching the benefits of electricity and teaching consumers how to efficiently use it while at the same time imparting their knowledge to co-op personnel. Eventually these programs became activities of each cooperative.

We believe that the same kind of effort by REA today on behalf of energy conservation would have a significant impact. We have recommended to the Agricultural Appropriations Committees that funds for perhaps 20 additional REA employees be authorized and that these employees be assigned to work with borrowers and their consumers in developing and carrying out energy conservation programs.

PROGRAMS FOR CONSUMER EDUCATION

Fourthly, the resolution recommended that REA intensify its efforts for developing and conducting communications and consumer education programs on a national, state or regional basis, and that it establish appropriate training programs for borrower personnel.

We also recommended to the Appropriations Committees that REA be given additional funds for personnel to beef up its conservation program. Specifically, it should have adequate funds for assisting its borrowers in meeting the requirements of its policies and to help train them in the necessary techniques for carrying out these policies.

NRECA itself will be looking to agencies within DOE for funding for energy conservation training programs for cooperative personnel. During 1979, NRECA conducted 23 two-and-one-half day workshops which trained 800 cooperative employees in home energy audit techniques. These workshops are being continued this year. Workshops on how to develop a "model" energy conservation program at the local cooperative level are also scheduled, as are several in the important area of load management. DOE funding is being sought for development and presentation of a workshop on conducting energy audits for small industrial or commercial consumers. Preliminary work is under way in evaluating the possibility of developing materials cooperative personnel can use in conducting farmstead energy audits.

Additionally, NRECA feels strongly that effective communications with consumer-members of our rural electric systems is the key to a successful energy conservation program. We have strengthened our own staff capability to provide assistance and information to our members in the area of member communications and, in cooperation with REA, have scheduled a major communications conference in Minneapolis early next month. We hope this conference will focus attention on the critical need for additional emphasis on communications and provide cooperative personnel with tools they can use in promoting energy conservation as well as communicating with their members on other important energy issues.

PROTECTING FINANCIAL INTEGRITY

Fifth, the resolution called for development of ways to assure that a system's financial integrity is protected from possible adverse, short-term, effects because of conservation—not only through the presently authorized program of loan and interest payment deferrals, but through such possible devices as partial loan forgiveness or other financial assistance.

REA has already announced that it will defer principal and interest payments for those borrowers who have encountered financial difficulties as a result of decreasing use of electricity by their consumers. We understand that it has already become necessary to use this program. While we sincerely hope that these financial difficulties are only temporary and that repayment deferrals are the only remedy that will be necessary, we will be closely monitoring the situation to determine if additional remedies may be needed.

In particular, we will be examining the possible need for legislation which might include partial loan forgiveness as one means of assisting cooperatives which are having extreme difficulties as a result of energy conservation efforts.

LOW-INCOME PROGRAMS

There is one additional area about which our electric cooperatives have expressed deep concern. We are ever mindful of the fact that a majority of our nation's low-income people live in rural areas, and as the primary supplier of electricity in most of our rural areas, we are concerned about the ability of these low-income people to avail themselves of energy conservation programs, particularly weatherization, and about their ability to meet the cost of their energy needs in the face of ever-spiraling prices.

Submitted with this statement are copies of two additional resolutions adopted at our recent annual meeting.

The first calls for appropriate social agencies to continue their programs of financial help for those with insufficient ability to meet their energy needs.

The second calls upon the Farmers Home Administration to revise its regulations regarding Section 504 grants under Title V of the Housing Act of 1949. These grants are becoming an important source of financing for weatherization and insulation for low-income rural people. The agency's regulations, however, restrict them to elderly families. We recommend that FmHA revise its regulations to make these grants available to all eligible applicants regardless of age and that USDA seek substantial increases in the funding for this program.

We are pleased to note that REA and DOE are also discussing ways in which rural electric systems can be more active in ongoing programs of weatherization assistance for low-income people.

In summary, Mr. Chairman, I believe the rural electrification program has demonstrated how rural people, when given the right tools, can overcome almost any difficulty to accomplish an important job.

Energy conservation is just such an important job. But it may require a new set of initiatives to overcome the severe problems of today. To say the least, no matter how dedicated to the wellbeing of their consumers a board or manager might be, it is understandable if they are sometimes reluctant to rush to devote precious staff time and money to an all-out energy conservation program in the face of already declining revenues and sharply increased costs and rates.

We believe, however, that with some new resources and a rechanneling of existing resources through an agency rural electric know how to work with and one that knows how to work with them, our nation's rural electric systems can once again demonstrate they have a delivery system that works.

[From NRECA Annual Meeting, 1980]

RESOLUTION No. A-1

From: Community and Economic Development Committee
Approved by: Resolutions Committee
Subject: Assistance in Payments of Energy Cost

Many groups and commissions have recommended that studies be made to determine if utilities should be ordered to establish "lifeline rates". It is our belief that this is unacceptable to the industry as it forces the industry into managing a welfare program for its consumers.

We agree that financial help should be available to meet the energy needs of those with insufficient ability to pay and further urge a program of assistance, to be operated under the auspices of appropriate social service agencies.

RESOLUTION No. A-4

From: Community and Economic Development Committee
Approved by: Resolutions Committee
Subject: Section 504 Grants

The Farmers Home Administration, under Section 504 of Title V of the Housing Act of 1949, is authorized to provide grants to low-income families for home repairs and improvements.

FmHA interprets home weatherization as within the scope of this authority. As a result, Section 504 grants are becoming an important source of financing for insulation and weatherization for low-income rural people. The Agency's regulations, however, restrict these grants to elderly families.

We recommend that FmHA revise its regulations to make Section 504 grants available to all eligible applicants regardless of age and urge USDA to seek substantial increases in the amount of grants for distribution by FmHA.

RESOLUTION F-1

From: Member Relations and Load Management Committee
Approved by: Resolutions Committee
Subject: Energy Conservation

Recognizing that conservation alone will not resolve all of the energy shortfalls, energy conservation still remains one of our nation's priorities as we struggle to overcome our dependence on foreign oil. Conservation efforts must begin with each member consumer and continue throughout our entire energy delivery system from the meter to the generator, with the ultimate objectives of using the resource of conservation to save our nation's energy resources and minimize the need for high-interest capital investment.

We commend those rural electric systems which have launched innovative and far-reaching programs to assist their consumer-members in using our valuable resources wisely and efficiently.

We believe that our program continues to be a leader in assisting consumers in saving our resources. At the same time we recognize that a number of problems relating to financial and staff resources face many systems as they develop their own programs to assist members, and that incentives for the consumer may not be sufficient to bring into being the kind of total commitment to conservation that is so vital in meeting the challenges of the 1980s.

We now urge all segments of our program to give highest priority to the development and implementation of programs designed to assist member cooperatives eliminate waste and improve efficiency.

Specifically we urge each cooperative to increase its commitment of resources to assist its members in recognizing the need for establishing and implementing effective energy conservation programs.

We recommend that the Congress consider the unique elements of the rural electrification program and its excellent working relationship with the Rural Electrification Administration and enact an energy conservation program tailored especially to the operating characteristics of REA borrowers. Such a program should be designed to provide these systems with a package of tools they can use in developing effective energy conservation programs and to provide them with assurances that their financial integrity will not be eroded.

We recommend that the Congress consider the following:

Authorize a low-interest rate program to provide for purchase and installation of weatherization and other conservation materials and equipment, and for load-control, heat-storage or other devices or equipment to conserve energy on the consumer's premises. Such loans should be made at an attractive interest rate to REA borrowers for relending to consumers to enhance conservation of energy.

Make it possible for REA to funnel grants (from funds appropriated for this purpose and/or provided through programs of other agencies) to REA borrowers or associations of borrowers for: testing and demonstrating supplemental energy technologies (e.g., wind, solar, biomass, methanol, methane, gasohol, heat recovery systems, load-control devices, lowhead hydro, etc.).

Authorize additional REA staff on a regional or state basis to provide assistance and encouragement to borrowers in the development of energy conservation programs and to assist them in meeting financial or other difficulties encountered with these programs.

Recommend that REA intensify its efforts for developing and conducting communications and consumer education programs on a national, state, or regional basis, and for the establishment of appropriate training programs for borrower personnel.

Assure that a system's financial integrity is protected from possible adverse, short-term, financial effects because of conservation, not only through the presently authorized program of loan and interest payment deferrals, but through such possible devices as partial loan forgiveness or other financial assistance.

[The following national summary was furnished by Mr. Partridge, the breakdown on a State-by-State basis has been retained in committee files.]

ENERGY CONSERVATION ACTIVITIES OF RURAL ELECTRIC SYSTEMS—SUMMARY OF A SURVEY CONDUCTED BY THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

Report Date: 4 January 1980

State: All

Number of member systems: 908

Number systems reporting: 789

Percentage reporting: 86.9

PART A: ENERGY CONSERVATION-WEATHERIZATION ACTIVITIES

1. Has your board adopted a policy on energy conservation? No. Answering: 784; No. Yes: 707; Percent Yes: 90.2.
2. Do you have a planned program for conserving energy in your own facilities? No. Answering: 771; No. Yes: 755; Percent Yes: 97.9.
3. Do you have a board-approved plan and budget for energy conservation activities in 1980? No. Answering: 766; No. Yes: 567; Percent Yes: 74.0.
4. Estimate how much your system will spend on energy conservation efforts in 1980? No. Answering: 734; Total: \$24,570,331; Avg/System: \$33,475.
5. How many of your employees will work full time on energy conservation efforts in 1980? No. Answering: 782; No. Empl.: 535; Avg/System: 0.7.
6. How many of your employees will work part time on energy conservation efforts in 1980? No. Answering: 777; No. Empl.: 5098; Avg/System: 6.6; No. Employees Full or Part Time: 5,633.
7. Estimate the number of staff hours you will devote to your energy conservation programs in 1980? No. Answering: 762; Total Hours: 2,012,547; Avg/System: 2,641.
8. Do your 1980 conservation plans include personal visits or energy audits to assist members? No. Answering: 777; No. Yes: 737; Percent Yes: 94.9.
9. How many members of your staff have had training in home energy audits? No. Answering: 777; No. Empl.: 1331; Avg/System: 1.7.

10. How many home energy audits have been conducted by your staff at members' homes?

	Number answering	Number audits	Average/ System
Prior to 1979	618	59,123	96
During 1979	703	47,453	68
Estimated 1980	648	111,098	171
Total number of audits		217,674	

11. How many home energy audits have your members conducted themselves as a result of information or forms provided by you or in cooperation with another organization?

	Number answering	Number audits	Average/ System
Prior to 1979	372	30,678	82
During 1979	421	74,744	178
Estimated 1980	376	74,333	198
Total number of audits		179,755	

12. Please indicate how you are promoting energy audits or conservation.

	Extensive	Some	Not any	Extensive plus some
System Newsletter	397	168	110	565
Statewide Publ	389	240	95	629
Bill Stuffers	78	205	334	283
Pamphlets, etc	207	426	61	633
Media Ads	192	404	110	596
Personal Contact	368	380	8	748
Other	112	121	1	233

13. Do you sell or install weatherization materials? Sell: 38; Install: 2; Both: 15; Neither: 734. No. Answering: 789; No. Sell/Install: 55; Percent Sell/Install: 7.0.

14. If you sell or install, how many members used your weatherization sales/service program?

	Number answering	Number members	Average/ System
Prior to 1979	40	5,884	147
During 1979	47	2,767	59
Estimated 1980	40	4,865	122
Total number members		13,516	

15. Do you have a home weatherization loan program? No. Answering: 786; No. Yes: 280; Percent Yes: 35.6.

16. Type of weatherization loan program: FmHA, 223; CFC, 6; Gen. funds, 16; TVA, 29; Other, 6.

17. How many home weatherization loans were made to your members?

	Numbers answering	Number loans	Average/ System
Prior to 1979	255	6,693	26.2
During 1979	266	10,432	39.2
Estimated 1980	192	19,308	100.6
Total number loans		36,433	

18. Total amount of loans during 1979: No. Answering: 254; Total: \$5,550,454; Average/System: \$21,852.

PART B: LOAD MANAGEMENT

1. Does your system have any type of load management program? No. Answering: 778; No. Yes: 384; Percent Yes: 49.4.

2. Kind of Load Control Program: Direct Control: 127; Voluntary: 257.

3(a). Type of Direct Control Equipment (No. Systems): Radio: 64; Ripple: 22; Other: 41.

3(b). Equipment Under Direct Control (No. Systems): Dual Heat: 21; Heat Storage: 9; Water Heaters: 54; Air Cond.: 7; Irrigation: 29; Other: 6.

4. How many consumers have some load under control? No. Ans: 121; Total Cons: 142,756; Average/System: 1,180.

[News Release]

NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION, Washington, D.C., January 20, 1980.

RURAL ELECTRIC COOPERATIVES CUT GROWTH IN POWER USE YEAR-END REPORT BY NRECA REVEALS

WASHINGTON, D.C.—The nation's rural electric systems have nearly cut in half their historical annual power growth rate of 10 percent.

Moreover, the hundreds of cooperative systems which distribute power to their consumer-members in 46 states have budgeted more than \$25-million for energy conservation activities in 1980.

That's the report of the National Rural Electric Cooperative Association (NRECA), the rural electric's national service organization, which released results today of a comprehensive year-end survey of its 908 distribution system members.

In releasing the report, Robert D. Partridge, executive vice president of the association, noted that analyses of the latest available figures—those for 1978—show that kilowatt-hour usage by rural electric consumer-members increased only 5.8 percent that year. During the 10-year period ending in 1975, rural electric power sales had increased an average of 10 percent annually, reaching a peak of 12 percent in 1972.

Partridge said, "It's clear that rural electric systems and their consumers are making an important contribution to our nation's conservation efforts. In fact, if we were still expanding at our historical growth level we would have consumed an additional 5.7 billion kilowatt-hours in 1978. That's enough to power all the homes in Washington, D.C. for a year-and-a-half.

"Rural electric systems, however, will probably continue to be the fastest growing segment of the utility industry. In 1978 alone, an estimated one-million people moved onto rural electric lines. And we see no early end of the movement of people back to the land."

Partridge noted that 213 co-ops, or 23 percent of all the NRECA member-systems, actually sold fewer kilowatt-hours for farm and rural residential use in 1978 than they did in 1977. Another 196 co-ops had an increase of less than three percent. In all, 64.1 percent of the rural electric systems registered a growth per average residential and farm meter of less than five percent.

Of the systems with higher growth rates, many were concentrated in the Midwest, Partridge said, where a severe winter was an important factor. He also said systems in that area report that consumer concern over the availability and price of fuel oil and propane has resulted in most new homes being all-electric, along with an upsurge in the installation of electric devices for supplemental or back-up heating.

"Since most of the electricity on that area is generated by coal-fired or hydroelectric plants," Partridge said, "we believe that this substitution of electricity for scarce fuels is also contributing to the nation's conservation efforts. We also believe that substitution of electricity for oil and gas will continue, further adding to the nation's power demands."

"From the hundreds of comments by rural electric systems on their energy conservation programs, it is difficult to select one that is typical," Partridge said, "but the remarks of a Texas co-op manager come as close as any to being so. He wrote:

"We feel that the members will greatly benefit from our energy conservation program by saving energy and lowering monthly power bills. Our cooperative will benefit by the one-to-one contact with members and the reduction of investment in other facilities. This cooperative has implemented the aforementioned (energy) policy since 1961. By using 1977 as a test year, this co-op saw a 7.1 percent reduction in the increase in kilowatt-hours consumed per residential meter in 1978. We feel this is a result of our energy conservation program."

Partridge continued: "The nearly 90 percent return that we received on our survey not only confirms the fact that rural electric systems are committed to the nation's energy conservation goals but it gives us definitive facts and figures, state by state and co-op by co-op, to work with in shaping future efforts."

He said he would be asking the association's membership to analyze this information at its annual meeting in March and make recommendations accordingly on new initiatives and expanded programs.

HIGH RESPONSE TO SURVEY

Of the 908 distribution systems, 789 responded to the association's survey seeking information on their energy conservation and load management activities and their involvement in alternative or supplemental energy projects.

Of these 789, 734 reported they had already budgeted more than \$24,570,000 for their 1980 energy conservation activities, with others indicating their budgets were not yet final.

Ninety-five percent of the systems said that their 1980 plans include personal visits or energy audits to assist their members in energy conservation.

Among the survey respondents, 648 said they plan to conduct more than 111,000 energy audits of their members' homes—more than twice as many as they conducted in 1979.

Also the systems indicated they plan to devote more than two-million employee hours to energy conservation—an average of 2,640 hours per system. (The average rural electric distribution system serves only about 8,000 homes and businesses.)

About half of the systems have initiated either direct or voluntary load-management programs with the objective of lowering usage during peak demand periods. The 121 systems using direct-control programs—programs which use system-controlled devices or timers to turn off certain high-demand electrical equipment at specified times—reported that nearly 143,000 consumer loads were involved. Many of these were large loads, such as irrigation equipment, which are a major factor in total demand.

About a third of the systems have weatherization or conservation-related loan programs for their members, with 254 systems reporting loans totaling more than \$5.5-million in 1979. The bulk of these loans were made by systems in the Tennessee Valley area, where a TVA-initiated program which includes no-interest loans has been tremendously successful.

The great majority of the systems were using the full range of communications media to promote energy conservation, with personal contact—the traditional communications method for the consumer-owned systems—being the most widely used. Member newsletters and consumer publications of state rural electric associations were also extensively used.

SUPPLEMENTAL ENERGY SOURCES

An additional section of the NRECA survey seeking information on rural electric systems' involvement in supplemental energy programs turned up an extensive array of projects on the local level.

About one-third of the systems outlined ongoing projects in their service areas and most of these indicated they were involved at some level.

Most systems were providing information and technical assistance to members installing wind, solar or similar supplemental energy devices, and some systems have already adopted policies to buy excess energy from these consumer-owned devices.

More than 100 systems reported direct involvement in supplemental energy projects, including the following.

One of the largest wind generators in the world is being operated by a North Carolina cooperative with the Department of Energy and the National Aeronautical

and Space Administration—just one of many wind projects being undertaken by rural electricians.

A co-op in North Dakota has converted all of its vehicles so they are fueled by gasohol as a part of its internal energy-conservation program.

A New Mexico cooperative is one of many cooperating with DOE and others in solar energy demonstrations.

Co-ops in North Carolina are seeking funding for a peat-fired generating plant in the eastern part of that state.

An Alaska co-op is proposing to build three or four generating units which will use waste heat from pumping stations on the Alaska Pipeline.

Rural electric cooperatives throughout the nation are working with DOE and REA to identify and evaluate potential sites for small hydroelectric projects, with a few projects already well underway.

Co-ops in Mississippi and Alabama are studying the possibility of using off-peak power to compress air in underground salt domes and then use the air to generate power in peak periods.

Systems in Idaho, Utah, Texas, and elsewhere are among those working on geothermal power projects.

A system in Oregon is one of several working with commercial consumers on a cogeneration project that would use waste products to generate power for the consumer's own use, with the excess flowing into the system for use by other consumers.

A Pennsylvania cooperative is among several that are incorporating solar-assisted heating or water heating in their new facilities (NRECA's year-old headquarters building in Washington has a solar water-heating system).

On the national level, with the support of its member systems, NRECA has carried out a number of research projects aimed at energy conservation. These include efforts in mobile home retrofitting, use of infrared technology in identifying heat loss, development of the heat pump water heater, demonstration of solar crop drying and irrigation load management, among others.

In addition more than 300 rural electric cooperatives are providing financial support as partners in the \$225-million (1980) research program of the Electric Power Research Institute, which is placing primary emphasis on energy conservation technology.

PARTIAL LISTING OF ALTERNATIVE ENERGY PROJECTS AND ACTIVITIES AMONG THE NATION'S RURAL ELECTRIC SYSTEMS—APRIL 30, 1980

(By Wilson Prichett III, Alternative Energy Specialist, Energy and Environmental Policy Division, National Rural Electric Cooperative Association)

I. BIOMASS UTILIZATION

a. Wood fired powerplants

(i) Coweta-Fayette EMC, Newman, Georgia, and Ogelthorpe Power Corporation, Atlanta, Georgia—Together are studying with Shenandoah, (a new model community southwest of Atlanta) the design, planning and integration of a possible wood waste powerplant in that Community.

(ii) Columbia Basin Electric Coop., Heppner, Oregon—Together with Kinzua Corporation is studying the feasibility of a wood waste generating facility in Heppner.

(iii) French Broad Electric Membership Corp., Marshall, North Carolina—Has finished a feasibility study for a 15 megawatt wood fired steam generating plant. Has submitted a proposal for funding from the Department of Energy to build it.

(iv) Minnkota Power Cooperative, Grand Forks, North Dakota—Has been experimenting with the burning of wood pellets as fuel at their 21.5 MWe steam-electric generating plant at its Grand Forks headquarters locations.

(v) New Hampshire Electric Cooperative, Plymouth, New Hampshire—Cooperative venture with the Tillotson Rubber Company, Dixville, New Hampshire, to eventually build three 1.5 MWe waste-wood fired generating units. One has been built and is operating so far.

(vi) Union River Electric Cooperative, Aurora, Maine—Is studying the feasibility of grinding up local resources of brush and waste wood for fueling a generating station. Presently, they heat all of the shop and some of their offices with wood.

(vii) Pacific Northwest Generating Company, Portland, Oregon, and Clearwater Power Company, Clearwater, Idaho—Are cooperating with the US Forest Service BPA and a number of local lumber companies in determining resources available and economic feasibility of several 20-50 MWe wood waste fired generating stations in their service areas.

(viii) Wolverine Electric Cooperative, Big Rapids, Michigan—Have just completed a feasibility study for a 25 megawatt wood fired steam generating plant.

Wood Stoves.—(i) North East Mississippi Electric Power Association, Oxford, Mississippi, and North Georgia Electric Membership Cooperative, Dalton, Georgia—To name a few, are assisting their members in installing wood stoves as an energy conservation measure.

b. Peat-fired plants

(i) North Carolina Association of Electric Cooperatives Raleigh, North Carolina are studying the feasibility of a 150 megawatt generating station using local peat as the fuel, are experimenting with different methods for mining the peat and have applied to EPRI and the Department of Energy for assistance in developing the project.

c. Agricultural waste-fired powerplants

(i) Basin Electric Power Cooperative, Bismarck, North Dakota—Is experimenting with burning sunflower hulls (mixed with coal) as supplementary fuel in their 40 megawatt William Neal generating station at Velva, North Dakota. Basin would like to trade process steam for sunflower hulls with a sunflower processing plant which may be built nearby.

d. Liquid fuels from biomass

(i) Bon Homme, Yankton Electric Association, Tabor, South Dakota—Is helping to finance an alcohol fuels plant at nearby South Dakota State University.

(ii) East River Rural Electric Power Cooperative, Madison, South Dakota—Has just completed a feasibility study for converting organic material from waste into fuel.

(iii) Great Plains Electric Cooperative, Colby, Kansas—Together with a local community college is building an alcohol fuels plant to provide fuel for a 75KW converted diesel generator that will supply the college with electrical power.

(iv) McCook Electric Cooperative, Salem, South Dakota—Together with NRECA, East River Electric Power Cooperative and South Dakota State University are financing a study of the feasibility of the hydrolysis of the cellulose and hemicellulose components of crop residues into sugars to be used in producing alcohol fuels.

(v) Minnkota Power Cooperative, Grand Forks, North Dakota—Has built and is operating a waste potatoes to ethanol plant at its Grand Forks Headquarters.

(vi) Oakdale Electric Cooperative, Oakdale, Wisconsin, and Jackson Electric Co-op, Black River Falls, Wisconsin—Are participating with some 30 farm cooperatives in the state of Wisconsin (through the Wisconsin Federation of Cooperatives) in the planning of a \$40 million alcohol-fuels (for gasohol) from-agricultural-products plant.

(vii) Verendrye Electric Cooperative, Inc., Velva, North Dakota—Is presently operating its entire fleet of 30 vehicles on gasohol fuel. In addition they are experimenting with the use of a mixture of sunflower oil and diesel fuel in diesel engines.

e. Solid waste combustion

(i) United Power Association, Elk River, Minnesota—Is experimenting with the burning of discarded automobile tires as a material to mix with coal in their coal fired plant.

f. Gaseous fuels from biomass

(i) Alaska Village electric cooperative, Anchorage, Alaska—Is working together with the State of Alaska (and Biomass Corporation in Yuba City, California) on a process for gasifying wood and burning the low BTU gas in an adapted reciprocating-gas-engine. The 170 kw prototype assembly is being tested in California. Soon it will be set up in Anchorage and given a trial run. Eventually it will be placed in the village of Nulato which is served by AVEC.

(ii) McKenzie Electric Cooperative, Watford City, North Dakota—Working together with a local egg farmer (with 20,000 laying hens) to study the feasibility of anaerobic digestion of the manure to produce methane gas for power production for the farmer's use (with the surplus going to the cooperative).

(iii) Mountain View Electric Association, Limon, Colorado—Assisted with the installation and operation of a biogas-from-pig-manure-project electric power generator at a nearby pig farm in Calhan, Colorado. The project is no longer running.

In addition, 30 other rural electric cooperatives indicated interest in projects utilizing biomass energy when queried by the Rural Electrification Administration (REA).

II. IMPROVED EFFICIENCY IN COAL UTILIZATION

a. Unconventional gas from coal seams

(i) Allegheny Electric Cooperative, Harrisburg, Pennsylvania—Has negotiated with a coal mine owner in Pittsburgh and Westinghouse Electric Corporation to build a 800 kwe coal-seam-gas-turbine-generating-station utilizing a combination of "GOB" gas enriched by gas from an unmineable coal seam.

b. Magnetohydrodynamics

(i) Duck River Electric Membership Corporation, Shelbyville, Tennessee—Plans to tie in their substation near the Tennessee Space Institute at Tullahoma to the 50 MWe Magneto-hydrodynamics demonstration plant being built there by U.S. Department of Energy. Power generated by that facility will be fed into the Duck River distribution system.

c. Coal liquefaction and gasification

(i) Minnkota Power Corporation, Grand Forks, North Dakota—In cooperation with a number of other utilities, including Dairyland Power Cooperative in Wisconsin, is attempting to get federal support for the construction of a \$2 billion lignite-to-methanol-liquefaction plant in the coal fields of western North Dakota.

(ii) North Central Missouri Electric Cooperative, Milan, Missouri, and Boone Electric Cooperative, Columbia, Missouri—In cooperation with a consortium of private citizens, legislators, etc., is attempting to obtain funding (has made a proposal) from the Department of Energy to help build $2 \times \$480$ million 300MWe coal gasification and combined cycle power plants in Central Missouri where there is lots of coal and interest.

III. GEOTHERMAL ENERGY UTILIZATION

a. Power production applications

(i) Concho Valley Electric Cooperative, San Angelo, Texas—Helping to finance geothermal research work in the Trans-Pecos area.

(ii) Lane Electric Cooperative, Eugene Oregon—Helping to finance geothermal research work in the McKenzie River Valley and near Oakridge, Oregon.

(iii) Navopache Electric Cooperative, Lakeside, Arizona—Has been seriously studying the feasibility of construction of 2×50 MWe power plants utilizing local Hot Dry Rock resources will be applying for assistance from the Department of Energy to do so.

(iv) Plains Electric G&T Cooperative, Albuquerque, New Mexico—Has been studying the utilization of local Hot Dry Rock resources since 1974. Recently they have been negotiating an arrangement with the Department of Energy to cooperate in the development of a power producing facility (using this resource) at the Fenton Hill site near Los Alamos.

(v) Raft River Rural Electric Cooperative, Malta, Idaho—Has been involved in the development of local hydrothermal resources for the purpose of generating electrical power for the past ten years. The Cooperative together with a consortium of Northwest Utilities is negotiating with the Department of Energy for the operation of the 5 megawatt facility that will be completed in 1980.

b. Space heating applications

(i) Rushmore Electric River Cooperative, Rapid City, South Dakota—Became interested in the use of local low temperature hydrothermal fluids for space heating applications in 1974. Sponsored and financed a study of the use of these resources in South Dakota which was done by the South Dakota School of Mines in Rapid City. This study has been used as a basis for others in other states of local direct heating applications of geothermal energy.

(ii) Lincoln-Union Electric Co., Alcester, South Dakota—Is helping a plumbing contractor in Beresford, South Dakota to install geothermal well fed heat exchanger house heating in over a dozen houses in their service area.

In addition the following is part of a growing list of Rural Electric Cooperatives actively involved in investigating the extent of geothermal resources in their service area their utilization for power production: Magic Valley Electric Co-op, Mercedes, Texas; Plumas-Sierra, REC, Portola, California; Rio Grande Electric Co-op, Bracketville, Texas; South Texas Electric Co-op, Victoria, Texas; Southwest Texas Electric Co-op, Eldorado, Texas.

IV. SMALL SCALE HYDROELECTRIC

a. Operating facilities

The following is a partial list of operating small hydroelectric plants at rural electric systems all over the country:

Name of cooperative	Location of plant	Plant capacity (kW)	Normal head-ft.
Alabama Electric Co-op	Alabama	5,200	40
Do	Alabama	2,440	25
Chugach Electric Association	Alaska	15,000	735
Metlakatla Power & Light	Alaska	3,000	750
Northern Michigan Electric Co-op	Michigan	560	20
Do	Michigan	1,200	42
Sho-Me Power Corp.	Missouri	3,000	40
Colorado-Ute Electric Association	Colorado	200	31
Copper Valley Electric Association	Alaska	12,000	620
Garkane Power Association	Utah	4,200	1,400
Moon Lake Electric Association	Utah	900	229
Do	Utah	1,200	650
Graig Boteourt Electric Co-op	Virginia	300	621
Oconto Electric Co-op	Wisconsin	1,000	19
Dairyland Power Co-op	Wisconsin	15,000	62
Lower Valley Power and Light	Wyoming	1,500	

* Three at 5,000 kW.

b. Facilities to be operating in near future

(i) Broad River Electric Cooperative, Gaffney, South Carolina—Has received a \$7 million grant from the U.S. Department of Energy to build a modern hydroelectric generating facility (3.9 MW capacity) into the Cherokee Falls Dam (18 Foothead) at Gaffney.

(ii) Wells Rural Electric Company, Wells, Nevada—Is rebuilding a small hydro generating facility that was shut down years ago. Will be finished in 1980.

In addition, a number of Rural Electric Systems have applied for or obtained permits for small hydro sites which they intend on developing in the future.

c. Feasibility studies

At least 15 Rural Electric Systems are funding feasibility studies for small hydroelectric generation facilities themselves.

In addition, at least 5 have submitted detailed feasibility studies to the Department of Energy in the hopes of obtaining construction assistance funds. And finally, some 43 Rural Electric Systems Small Hydro-site-nominations (in response to the U.S. Department of Energy's "Small-Hydroelectric-Feasibility-Loan-Program" and with REA assistance) have received the go ahead from the Corps of Engineers and will probably receive loans for detailed feasibility studies.

V. SOLAR ENERGY UTILIZATION

a. Solar thermal electric

(i) Colorado-Ute Electric Association, Montrose, Colorado—Is a member of the project advisory committee (utilities which review design and cost data and make design recommendations) for the nation's first solar thermal electric power plant (10 MWe in Barstow, California).

(ii) Central New Mexico Electric Co-op, Mountainair, New Mexico—Is providing assistance and working together with New Mexico State University on the Solar Thermal power irrigation site at Willard.

In addition 6, Rural Electric Systems have submitted proposals in response to the "Small Community Solar Thermal Power Experiment: Site Participation" Solicitation (issued in November 1979).

b. Photovoltaics

(i) Lea County Rural Electric Cooperative, Lovington, New Mexico—Has obtained a grant and is building a 150 Kilowatt flat-panel-photovoltaic-array to supply electrical energy to a new shopping center being built in Lovington, New Mexico.

c. Solar heating applications

(i) Basin Electric Power Cooperative, Bismarck, North Dakota—Main office building in Bismarck was retrofitted with solar collectors operating in conjunction with centrifugal water-water heat pump units. Solar heat and hot water for wash house in utility construction workers trailer park in Beulah, North Dakota.

(ii) Butte Electric Membership Corporation, Newell, South Dakota—Cooperating with the Department of Energy in the space heating and hot water flat plate solar project for local high school.

(iii) C & W Rural Electric Co-op. Assn., Clay Center, Kansas—Has completed an experiment swine farrowing house that has supplemental solar heating.

(iv) Carroll Electric Membership Corporation, Carrollton, Georgia—Co-sponsoring (with a local savings and loan company) the construction of a solar hot water and energy conservation demonstration house.

(v) Cotton Electric Cooperative, Walters, Oklahoma—Has a solar hot water heating system in its main office building in Walters. Is using this system for hot water and for providing data on Solar heating systems for their membership.

(vi) Douglas County Electric Membership Corporation, Douglasville, Georgia—Contributed to the costs and installation of two solar hot water heating systems in homes of members.

(vii) East River Electric Power Cooperative, Madison, South Dakota—Co-sponsoring with South Dakota State University a solar-collector-augmented-electric-heat-pump-project.

(viii) Eastern Iowa Light & Power Cooperative, Wilton, Iowa—Has purchased and installed one solar hot water heating system and two solar-assisted-heat-pump-hot-water-heating systems.

(ix) Green River Electric Corporation, Owensboro, Kentucky—Has subsidized the installation of the solar systems in two experimental homes in Daviess County. Is monitoring their performance.

(x) Jefferson Electric Membership Corporation, Louisville, Georgia—Cooperating in the construction and load characteristics study of 15 solar hot water and space heated homes nearby.

(xi) Kansas Electric Cooperatives, Topeka, Kansas—Planning a 50,000 square foot solar heated headquarters building with Kansas Electric Power Cooperative Inc. in Topeka.

(xii) Kit Carson Electric Cooperative, Taos, New Mexico—In cooperation with Solar Room Company is testing a number of solar room heaters on the co-ops property. Together they will be producing a report on their performance. The co-op is also giving away units to interested members.

(xiii) Lea County Electric Cooperative, Lovington, New Mexico—Helping to finance a solar water heater unit in a members home.

(xiv) National Rural Electric Cooperative Association, Washington, D.C.—Has a solar hot water heating system on the roof of their headquarters building in Washington.

(xv) Minkota Power Cooperative, Grand Forks, North Dakota—Provided a grant to the University of North Dakota to design and build a solar-augmented-heat-pump with thermal-energy-storage in Lammore, North Dakota.

(xvi) Middle Tennessee EMC, Murfreesboro, Tennessee—Using TVA loan funds, will be starting in the spring of 1980 to finance 1000 solar water heaters in their service area.

(xvii) Mountain View Electric Association, Limon, Colorado—Have designed their new operations facility in Mountain View to utilize passive solar heating.

(xviii) Oklahoma Electric Cooperative, Norman, Oklahoma—Is educating (giving free instruction) its members on how to build solar hot water heating systems.

(xix) San Luis Valley Rural Electric Cooperative, Monte Vista, Colorado—Forced air solar space heating installation operating in utility maintenance garage. Comparing electrical demand for two groups of local new homes; one group is solar heated, the other is not.

(xx) Sand Mountain Electric Cooperative, Rainsville, Alabama—Helped to build and is monitoring energy savings from three experimental solar heated green houses.

(xxi) Southern Iowa Electric Cooperative, Bloomfield, Iowa—Co-sponsoring with DOE and the local USDA Agricultural Research Station a project to demonstrate the use of solar and wind energy in a home near Bloomfield, Iowa. The system includes a solar assisted heat pump, a 25-ft. diameter wind turbine, and thermal storage facilities.

(xxii) Steele Waseca Electric Cooperative, Owatonna, Minnesota—Has purchased a (and is monitoring the performance of) solar hot water heating system which was installed in a member's home.

(xxiii) Tipmont Rural Electric Membership Corporation, Linden, Indiana—Planning solar space heating installation for new headquarters construction (9,000 square foot office building and 15,000 square foot warehouse).

(xxiv) Wyoming State Rural Electric Association, Casper, Wyoming—Awarded a grant by the Department of Energy to build a 9,000 square foot solar space heated and cooled office building. The System is installed and operating.

(xxv) Verendrye Electric Cooperative, Velva, North Dakota—Has a Solar Hot Water heater display underway at its headquarters building in Velva.

In addition, at least 8 Rural Electric Members are providing financial assistance to members who want to convert their heating equipment.

ix. Other grain drying and agricultural projects have:

(i) Benton County Electric Cooperative Association, Victor, Iowa—Assisted local farmers in the construction and operation of a solar-crop-drying-bin facility in Benton County.

(ii) Bon Homme-Yankton Electric Association, Inc., Yankton, South Dakota—Helped to finance a solar-crop-dryer in conjunction with nearby South Dakota State University.

(iii) East River Electric Power Cooperative, Madison, South Dakota—Co-sponsored three demonstration solar crop drying bins with Kingsbury Electric Cooperative Inc. and South Dakota State University.

(iv) H-D Electric Cooperative, Clear Lake, South Dakota—Converted a grain bin to solar crop drying bin. Monitoring the performance.

(v) Jackson Electric Membership Corporation, Jackson, Georgia—Co-sponsored solar crop drying project with National Rural Electric Cooperative Association.

(vi) Kingsbury Electric Cooperative, DeSmet, South Dakota—Adapted grain drying bin to solar using homemade solar collection and air moving system. Project co-sponsored by South Dakota State University.

(vii) Oconee Electric Membership Corporation, Dudley, Georgia—Cooperated with Georgia Electrification Council and University of Georgia Extension Service in the demonstration of a solar crop drying system.

In addition, some 16 other rural electric cooperatives indicated interest in solar energy utilization projects when queried by the Rural Electric Administration in early 1979.

VI. WIND ENERGY UTILIZATION

(i) Adams Electric Cooperative, Gettysburg, Pennsylvania—In combination with Allegheny Electric Cooperative and NRECA, will install, interconnect with their distribution line, and test an 8 kilowatt vertical axis wind turbine generator from Alcoa.

(ii) Blue Ridge Electric Membership Corporation, Lenoir, North Carolina—Selected by the U.S. Department of Energy to be the site of the world's largest windmill (2 megawatts electric generating capacity). Blue Ridge EMC performed siting evaluations, helped in construction and will be operating the facility and managing the interconnect with their distribution system. The power from the windmill will service some 800 homes in their service area.

(iii) Central Power Electric Cooperative, Minot, North Dakota—Are working with the backing of the state of North Dakota and several universities. Has applied for a grant from the Department of Energy for a wind tower measuring station in order to determine the feasibility of a large wind generator and as part of a plan to develop an abandoned Air Force radar station into an Energy Research Institute for the Northern Plains.

(iv) Corn Belt Power Cooperative, Humboldt, Iowa, and Wright County RRA, Horton, Iowa—Are engaged in a research and demonstration project which involves integrating in wind, solar and biomass applications with a goal of working towards energy independence on a farm in Wright County area.

(v) Craig County Electric Cooperative, New Church, Virginia—Working with Virginia Electric Power Company, considering the use of individual household wind turbines and the interdependence problem associated.

(vi) East River Electric Power Cooperative, Madison, South Dakota—Participating in Phase I of the NRECA large wind turbine generators (1.5 MW) demonstration program. Wind data are being collected in a site prepared for 1 or 2 possible turbines.

(vii) Eastern Valley Electric Association, Fairbairn, Alaska—Installing a 20 KW wind generator near Bethel, Alaska.

(viii) Kittitas County Public Utility District, Goldendale, Washington—Is helping Bonneville Power Administration with the installation and siting of 22 low to three kilowatt wind generators in their service area.

(ix) Lea County Electric Cooperative, Lovington, New Mexico—Together with the New Mexico Department of Energy and minerals are installing and financing a 25 KW wind generator experimental installation on a local farm.

(x) Northern Wasco County Public Utility District, The Dalles, Oregon—Has been selected as one of the two organizations in Oregon to test small wind energy systems under the Department of Energy's Rocky Flats "Field Evaluation" Program. The district will receive a 2 KW unit with a gemini converter.

(xi) Norton-Decatur Cooperative Electric Company, Norton, Kansas—Has financed, built and installed a wind recorder system and is collecting information on wind velocity in their service area.

(xiii) Boulder Valley Rural Electric Association, Fort Collins, Colorado—Cooperates with the University of Colorado in investigating the demonstration of water and hydrogen fuel using electricity from wind generators as a possible fuel source.

(xiv) Southern Iowa Electric Cooperative, Muscatine, Iowa—Cooperating with NRSE and the local USDA Agricultural Research Station a project to demonstrate the use of solar and wind energy in a household. (See Page 10 entry 18).

(xv) Spink Electric Cooperative, Redfield, South Dakota—Helped to finance and construct a 10KW wind generator on a farm five miles east of Tutu, South Dakota.

(xvi) Sulphur Springs Valley Electric Cooperative, Wilcox, Arizona—Is working together with a member and the Schneider Lift Translator Company of Irving, Texas on the feasibility of installing a lift translator wind generator at the member's site.

(xvii) Swisher Electric Cooperative, Tulia, Texas—Has installed a 25 kilowatt horizontal 3-blade wind turbine which has been providing power alternately to an irrigation pump and an AC generator feeding into the coop's distribution line. Plans are to install 8-10 more of these machines doing similar service at Swisher and some of the surrounding rural electric cooperatives. Also, Swisher plans to install a dozen small machines 2-4KW in residential locations and to build a larger machine on the order of 100 KW for generating electricity only.

(xviii) United Electric Cooperative, DuBois, Pennsylvania—Financed the construction of a wind generator on a house on cooperative property serving a cooperative employee. Are monitoring its performance.

(xix) Victory Electric Cooperative Association, Dodge City, Kansas—Has been chosen by the Kansas Energy Office to receive one of the Small Wind Generators to be installed in that state under the U.S. Department of Energy's Field Evaluation Program being run through Rocky Flats Test Site in Colorado.

(xx) Vigilante Electric Cooperative, Dillon, Montana—Together with nearby company is installing a 22KW wind generator near Whitehall, Montana.

(xxi) Washington Island Electric Cooperative, Washington Island, Wisconsin—Together with the town of Washington, has been developing an alternative energy plan (i.e., wind generators and solar heating to supplement electrical energy and heating requirements respectively). At present, all of their electricity is generated by diesel.

Also, 60 rural electric cooperatives indicated an interest and responded to the Department of Energy's Program Opportunity Notice for siting of large wind energy systems (MOU) 2-2.5 megawatts each) at latest count.

And, in addition, 26 others responded to the Rural Electrification Administration's request for interest in wind energy systems installations in 1979.

Two Tennessee rural electric cooperatives are among the 4 sites which have been chosen by the Tennessee Valley Authority for site surveys and installation of small wind generators.

And finally, some 17 Rural Electric Systems in Oregon are providing 20.5 percent of the funding for the 300 KW vertical axis wind turbine project to be installed at a site in the city of Eugene, Oregon.

VII. ENERGY STORAGE SYSTEMS

a. Compressed air storage

(i) Alabama Electric Cooperative Association, Andalusia, Alabama—Is doing a preliminary economic feasibility study of a 250 megawatt salt dome compressed air storage facility in southwestern Alabama in coordination with the South Mississippi Electric Power Association.

(ii) Southern Power Cooperative, Decatur, Illinois—Is planning a 200 MWe hard rock compressed air storage facility. Has done feasibility study and is negotiating with NRSE and DOE for financial assistance.

b. Battery storage

(i) Wolverine Electric Cooperative, Boyne City, Michigan, and Northern Michigan Electric Cooperative, Big Rapids, Michigan—Have been chosen as the prime contractors for the Department of Energy's \$15 million utility-scale peak-shaving battery-storage project. The two G&T cooperatives will design and build a storage battery electric energy facility in Hershey, Michigan.

(11)

STATEMENT OF ALFRED H. HIGGS, General Manager, GUADALUPE VALLEY
ELECTRIC COOPERATIVE, INC., DOWNEY, TEX.

I. GENERAL INFORMATION

A. Organization and service area

Guadalupe Valley Electric Cooperative, Inc. (GVEC) was incorporated in 1939, as a Texas cooperative corporation, with the first section of the system being energized in 1940. With subsequent loans from REA and CFT, extension of service has been completed into the rural areas of Gonzales, Guadalupe, Lavaca, Wilson, DeWitt, Caldwell, Fayette and Bexar Counties. The two counties which are almost totally included within the Cooperative's service area are Gonzales and Guadalupe. Dominantly rural and agricultural in the past, the service area of the Cooperative is being increasingly influenced by residential, commercial and industrial development, with major activity being in areas located in central Gonzales and northern Guadalupe Counties.

B. Location

The Cooperative's headquarters office and main warehouse are located in Gonzales, Texas, where all business and operational activities are conducted and supervised. Other office and warehouse facilities are located in Seguin and Schertz, Texas.

Operational and construction capabilities include heavy construction crews, underground construction crews, substation and apparatus crews, mobile meter testing, apparatus shop, meter laboratory, business affairs, consumer services and information, engineering services, data processing facilities and administrative.

C. Geography and climate of service area

The Cooperative's service area is principally located in the Texas Coastal Plains. The terrain typically ranges from flat to gently rolling hills, with an elevation of between 100 feet and 1000 feet above sea level.

The normal vegetation is lush, with some timber cover, grasses and brush indigenous to the area. Rich bottom soils with many oaks and pecans are found along the rivers and tributaries. The above soil and terrain conditions contribute greatly to the agricultural productivity of the Cooperative's service area.

The Guadalupe and San Marcos rivers transverse the system, while the Lavaca River and Cibola Creek form portions of the eastern and western boundaries, respectively. Various lakes are found at intervals along the two major rivers.

The climate is of a modified subtropical nature, predominately continental (mild) during the winter months and hot to very hot and humid during the summer. Normal mean temperatures range from 50 degrees F. in January to 85 degrees F. in July. Relative humidity averages above 80 percent in the morning hours, dropping to near 60 percent in late afternoon.

The normal annual rainfall is 57.3 inches, and the average growing season is approximately 270 days, which is sufficient for the normal production of most crops.

Normal degree-days heating, on a 65 degree base, is 4070, with 2000 degree-days cooling.

II. SYSTEM GROWTH PATTERNS

The Cooperative has a history of steady growth in members, plant investment and KWH sales. This trend became accelerated in the 1960's with sales exceeding 300,000 per year. The average growth in sales from 1960 was exceeding 10%, as new members and construction were being developed. Homes were being built or converted to all electric, light commercial was being constructed and some heavy industry was being developed.

Previously, prior to this growth being realized, the Board of Directors of GVEC had approved Member Service activities to be developed. This involved work that caused the members to include the most efficient construction practices in new construction of homes, businesses and industry. Very involved work in design of thermal standards, adequate wiring and lighting, heating and air-conditioning systems, new construction methods for agricultural buildings, irrigation pump research programs, plus extensive research to be conducted on the electric heat pump.

All of the above activities were developed to lessen the energy requirements of GVEC members, allowing the electric system to be more efficient and requiring reduced investment to meet the electric needs of the membership.

The Member Service program of GVEC was started in 1958, at which time the summer peak load of the system exceeded the winter peak load by some 200 percent. This was determined to be unacceptable, as investment in plant to service the summer load was idle to a large part in other seasons. To lower or modify the summer loads, it was determined to encourage insulation of homes, as air-condition-

was the same contribution load. An insulation was being contacted to insure for in future of national standards. It was determined that the Union Electric Plant that the station of the Cooperative and that of the member could be better utilized, allowing more continuous annual loading of the station.

During the last 12 to 15 years, the GVEC system peak loading has been essentially equal, summer and winter.

Total services in place has continued to grow, with 15,853 consumers being served in 1972, growing to 21,095 at the end of 1979 (Exhibit 1). The number of annual connects have accelerated in recent years, average 1,036 per year, 1972 through 1979. (Exhibit 2). A sharp decrease in new connects was realized in 1975, being the time of rapidly accelerating generating fuels impacting the membership. Also, the national economy experienced a slow down in this period.

The GVEC electric system involving some 3646 miles in 1972 has grown to 4063 miles through 1979. This system involves transmission, 69KV and 138KV, 14 substation plus distribution lines. Presently, the system is being added to at the rate of some 60 to 70 miles per year.

The value of the electric system, being \$14.7 million in 1972 has increased to \$27.5 through 1979 and projected to be \$78.6 in 1989 (Exhibits 3 & 4). The Board of Directors and Management are very concerned about the rapidly increasing value of plant and the impact in electric rates that will follow.

Cost of purchased power has been the main impact on electric rates, rising from 6.28 mills in 1972 to 30.03 in 1979, with January, 1980, seeing costs per KWH reaching in excess of 36 mills. This cost is reflected in Exhibit 5 and is consuming some 78% of all revenues at the present time.

KWH sales have slowed in recent years, rising cost has affected this but the weatherization program of GVEC has assisted in this trend. Exhibit 6 illustrates the experience in recent years. Possibly, it would be well to point out that the GVEC system had previously experienced extremely rapid growth.

Revenues have grown to reflect the cost of purchased power, rising from a level in 1972 of \$3.2 million to \$17.0 million in 1979. Margins have been extremely erratic, as deficits were experienced in 1974 and 1975 after paying operation and principal expenses. Exhibit 7 shows these trends.

Revenue from residential sales were decreasing from 1965 through 1973, but because of fuel cost, began to rise in 1974, reaching 4.73¢ in 1979. Projections for the future show higher cost, reaching 5.60¢ in 1984 and 7.13¢ in 1989, (Exhibits 8 and 9).

III. SYSTEM OPERATION FOR EFFICIENCY

A. Meter inspection and maintenance

A program of maintaining of meters has been in effect for a number of years. A three-year cycle is being adhered to by personnel of GVEC. Inspection of meter location is made on a short time schedule.

These efforts are undertaken to maintain accurate and complete registering of KWH usage at each service.

B. Line loss

General attention has been given the operating cost since 1970, at which time the loss for the GVEC system was 9.51 percent, with National and Texas losses being 10.00 and 12.00 percent, respectively. We have recommended time added capacitor, capacitor banks and have achieved a reduction - being 8.7 percent in 1979.

This reduction in line losses can be very easily achieved by saving of energy and installing a more efficient electric system. Exhibit 11 has a percent on the GVEC line loss history.

C. Vehicle operation and maintenance

With 50 plus vehicles needed in the daily operation of the GVEC system, we decided to concentrate on greater total mileage per life of a vehicle, reducing of cost per mile and reducing annual mileage.

The GVEC vehicles are maintained by Staff mechanics, allowing less downtime and lower cost of maintenance—this program has been fairly successful as vehicles are used to high mileage, exceeding 125,000 miles with some units reaching over 200,000 miles. The highest record is 250,000, with only minor motor overhaul.

Reduced mileage of operation has been reached, with 1975 operation trending higher. Exhibit 10 shows this effort.

D. Building kWh reduction

With one exception, all GVEC buildings are all-electric and served by the Cooperative. In 1978 and 1979, greater weatherization activities were started. Insulation was added, solar screens were installed, water heaters insulated and placed on time

controlled operation, temperature within the building was maintained at 65 degrees in winter, 78 degrees in summer, interior lighting was reduced and exterior lighting, except security lighting, was eliminated.

The results for 1979 was a total reduction of 150,130 KWH or 15 percent less usage from 1978.

IV. OPERATING KEY RATIO ANALYSIS

Through the assistance of REA and CFC, each distribution electric cooperative receives annually ratio studies for analysis purposes and Management assistance. This service has been of great assistance to GVEC Management.

Exhibit 11 is a brief listing of the various ratios that show growth, investment, expense and return trends.

V. CONSERVATION ACTIVITIES OF GVEC

A. Energy efficiency and conservation policy

The activities with member services, prior to 1977 had been provided by a general operating policy. However, in 1977, a revised policy was approved—allowing the Member Service activities to proceed on more definite conservation programs. (Exhibit 12)

B. Member service staff

To coordinate the activities in the GVEC service area, a staff of 14 employees is maintained, assisted by two contractors. Exhibit 13, Member Service Organization chart reflects this staff.

C. Member service division budget

To facilitate the activities within this Operating Division, an adequate budget is developed. (Exhibit 14).

VI. CONSERVATION/WEATHERIZATION ACTIVITIES FOR GVEC MEMBERS

A. Appliance service shop

Beginning in 1970, this activity provides service for all electric equipment of the membership, excepting electronic. Service crews are available for home visit or conducting shop repairs.

This activity is based on self support basis, with no electric rate revenue being used to support it. The four employees involved maintain their parts inventory, record keeping and work schedule to support this operation.

During 1979, service was completed on 2,354 different items. The operation's margin was \$3,098.79.

B. Ceiling insulation program

Because of rising cost of electric service and lack of this service in the GVEC area, a program of insulating homes was started in 1973. It has been very successful—completing through 1979 a total of 1815 homes and businesses which involve 2,646,160 square feet of ceiling space.

A margin has been realized since the beginning—totalling \$60,404.00, with \$11,684.00 being realized in 1979.

Exhibit 15 shows the results of this program.

C. Insulating windows

Following ceiling loss within a building, we experience the next greatest loss/gain with windows. It was our determination that this area needed attention.

In 1977 the Insulation of Windows was started, with storm type windows, sashes and doors being installed by GVEC crews. This program is very time consuming and involved, so results have been slow.

Results are that 470 jobs have been completed from 1973 through 1979, involving 4,990 windows. The reception by the membership has been good. At present, we have a contractor installing windows on a daily basis.

Margins realized in the three-year period is \$6,704. Exhibit 16 shows activity.

D. Water heater insulation program

Depending on conditions, a water heater will consume 300 to 600 KWH per month, the largest usage within most homes other than air conditioning/heating usage.

In mid-1979, this program was started, resulting in some 200 units being installed through December, 1979.

No installation charges are made, resulting in a net cost to the member being \$18.00. This program is most cost effective—paying back in 6 to 9 months.

E. Home energy audits

Having been conducted in an informal basis for years, during 1979, a more complete approach was started.

By using a Class C, Home Audit, provided by the Texas Energy Council, some 972 audits were completed.

Class A Audits are being conducted on a requested basis. This program is very time consuming, but is beneficial to the member.

F. Finance of weatherization activity

Most members are financing these projects on a cash basis, by Farmers Home Administration Weatherization Loans, plus GVEC General Funds are used.

Weatherization Loans totals are as follows: 1977—\$30,920.00; 1978—\$96,988.00; 1979—\$127,978.00.

Losses have been small, with only five failures being experienced, totalling \$257.22.

G. Heat pump water heater research program

In cooperation with a partially funded program by DOE, GVEC has installed five heat pump water heaters in member homes, being completed in mid-1979.

The monthly reports appear good, with reduction in usage approaching 33 percent. Final reports will not be available until mid-1980.

H. Load research project

To determine better information on electric load characteristics, for rate design and proper allocation of facility costs, a project has been developed involving GVEC and 13 other cooperatives. The service area of these cooperatives reach from near Houston, Texas, on the east, to Carlsbad, New Mexico, on the west, Austin, Texas, on the north to the Mexico border on the south.

The 14 electric cooperatives have installed recording magnetic tape meters on required locations within this broad area. Monthly data is being gathered and stored on computer, located at the Texas Electric Cooperatives, statewide association of the Texas Cooperatives. The project follows the guideline of the PURA requirements, has received procedure approval by the Texas Public Utility Commission.

The project will continue for a term of 12 to 24 months, with an evaluation being made at the conclusion. Through PUC assistance, a DOE grant for this evaluation has been granted to the TEC, the statewide association.

Other than rate design, and more detailed allocation of cost, we are anticipating the developing of data that will allow load management programs to be developed.

VII. SUMMARY

The Energy Conservation program of GVEC has been in the developing and implementing process for many years—with the need for greater efficiency of operation being recognized by prior management in the mid-1950. With the anticipated increase cost of fuels and operation, the present management, with complete Board of Director support, has placed considerably more emphasis on this activity since 1972.

The various items of growth information within this report are illustrations of the various areas needing to be considered as a program for developing system efficiency, energy conservation and load management as initiated. As no two electric utilities have the exact types of load characteristics, it is essential that inner-analysis of each system be completed, allowing more definite decisions to be made concerning needed programs.

At GVEC, we have balanced our peak loads, which allow for greater use of the investment of the system, thermal standards of essentially all homes and businesses are higher than normal, assistance is available to the membership to develop any type of conservation project, be it greater insulation, equipment design or service and finance of the project, plus numbers of other activities.

But, we can do much more—we must increase the load factor of this system, allowing greater utilization of the electric plant. This can be partially achieved by conservation practices; however, load management by remote control will be necessary to achieve the maximum. With the completion of the Load Research Project, the needed Load Management program can be implemented.

As greater utilization of plant is realized, the capital additions, anticipated by present trends of thought, should be lower. If this is accomplished, the electric rates can also be lower.

It has always been the desire of the GVEC Board of Directors to develop and operate this system for the maximum benefit of the member. As General Manager of the project since 1972, I believe the operation reflects the Board's desire.

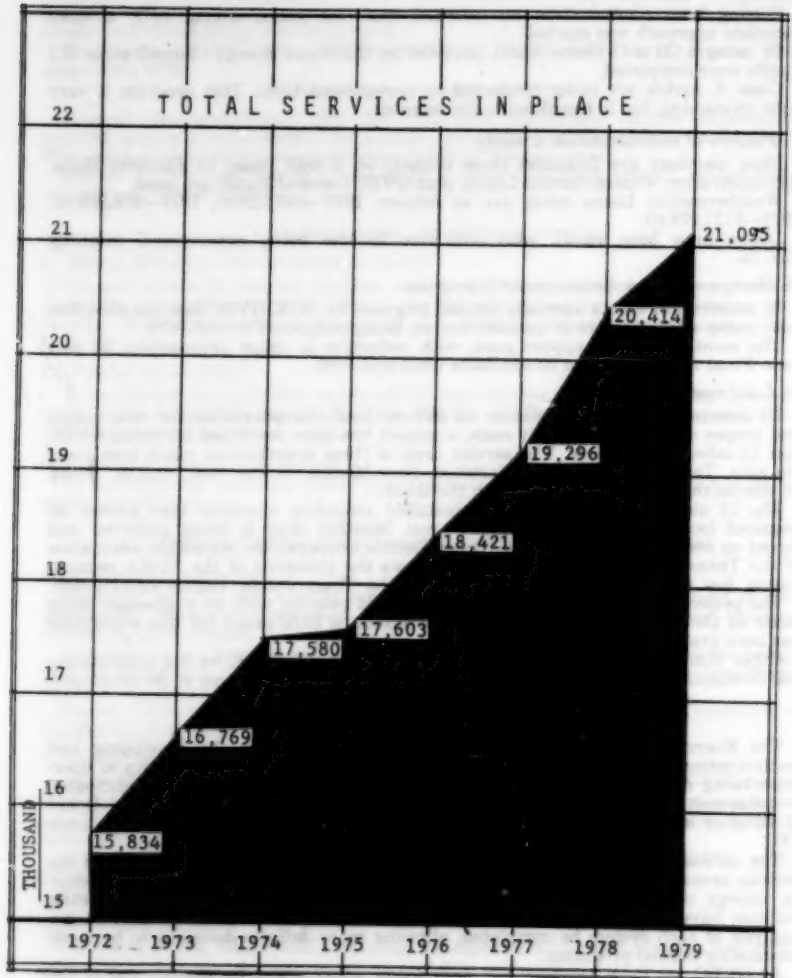


EXHIBIT 1

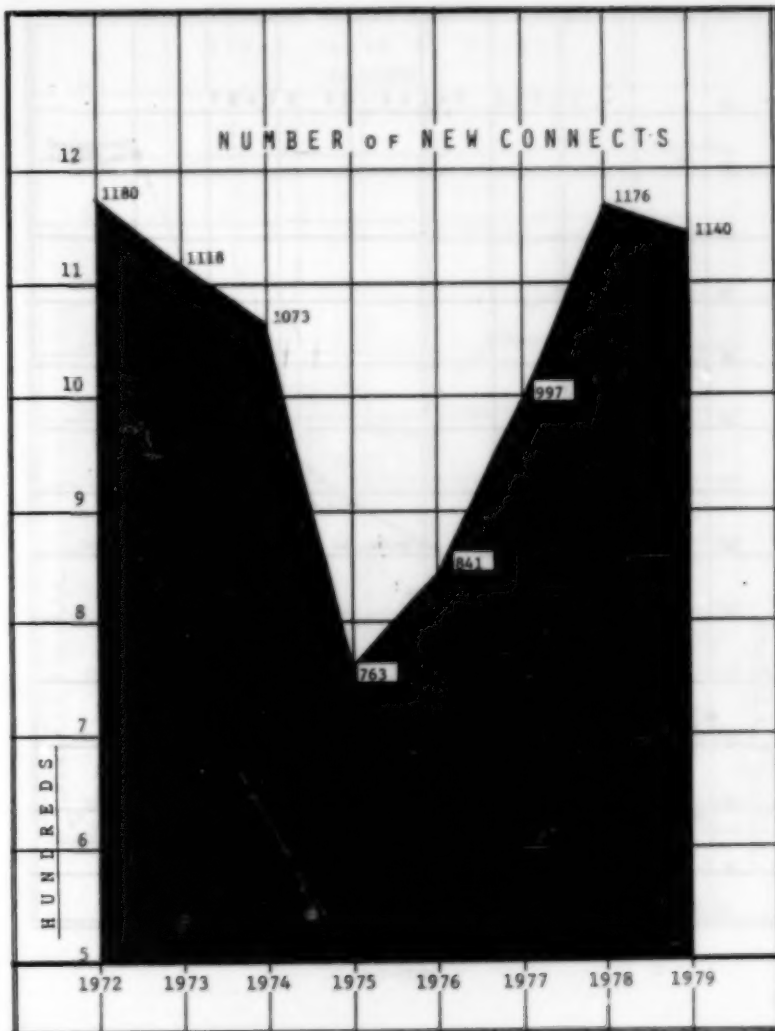


EXHIBIT 2

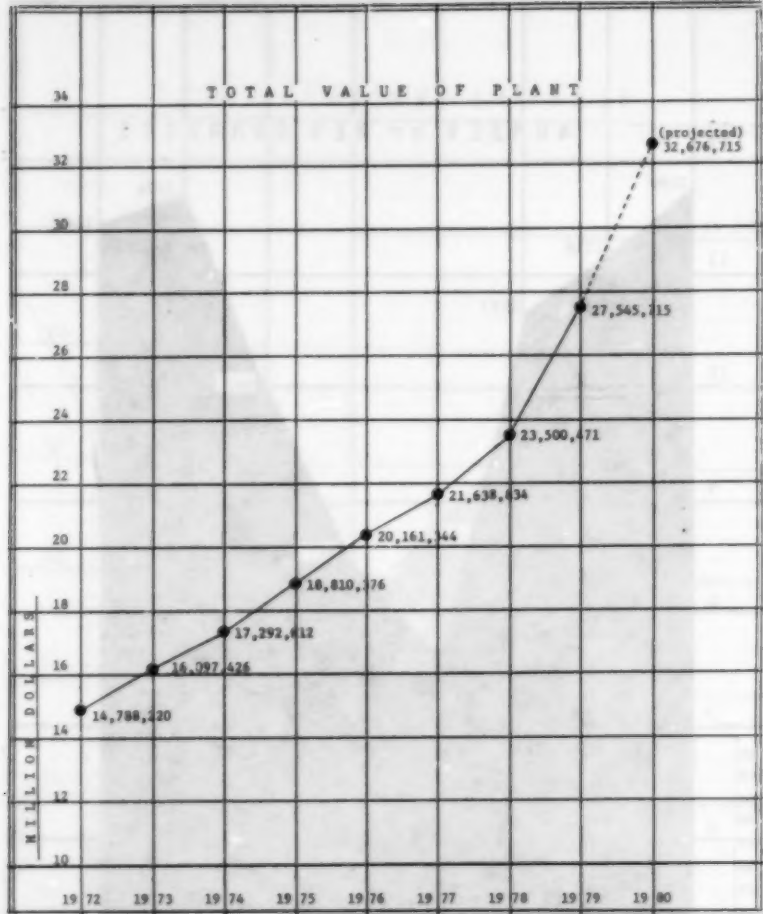


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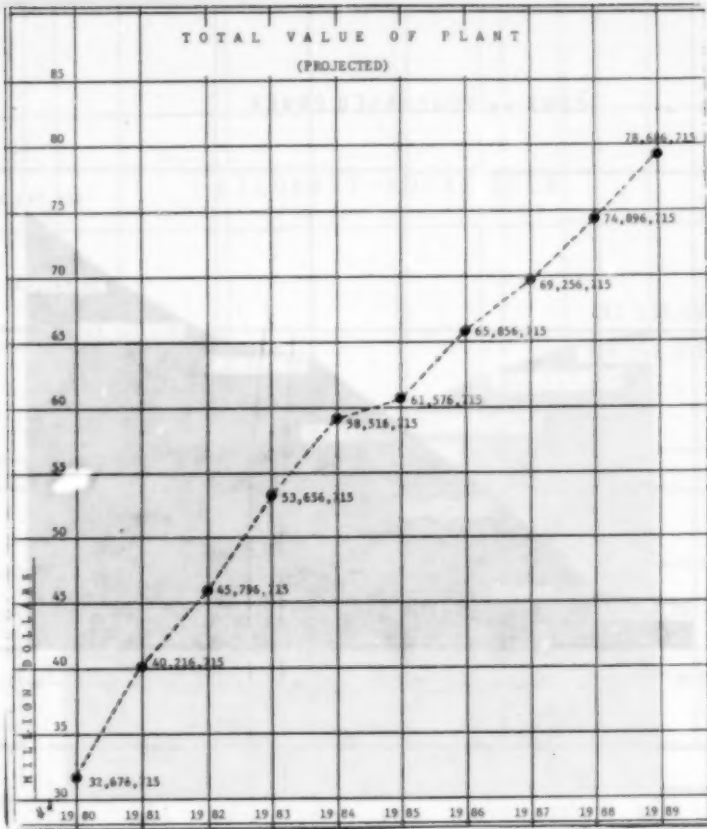


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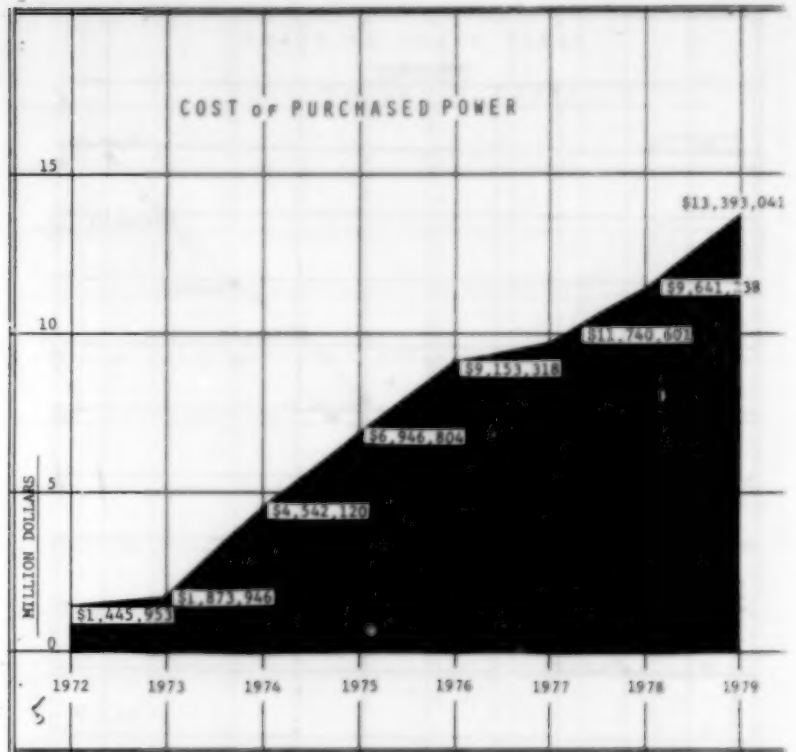


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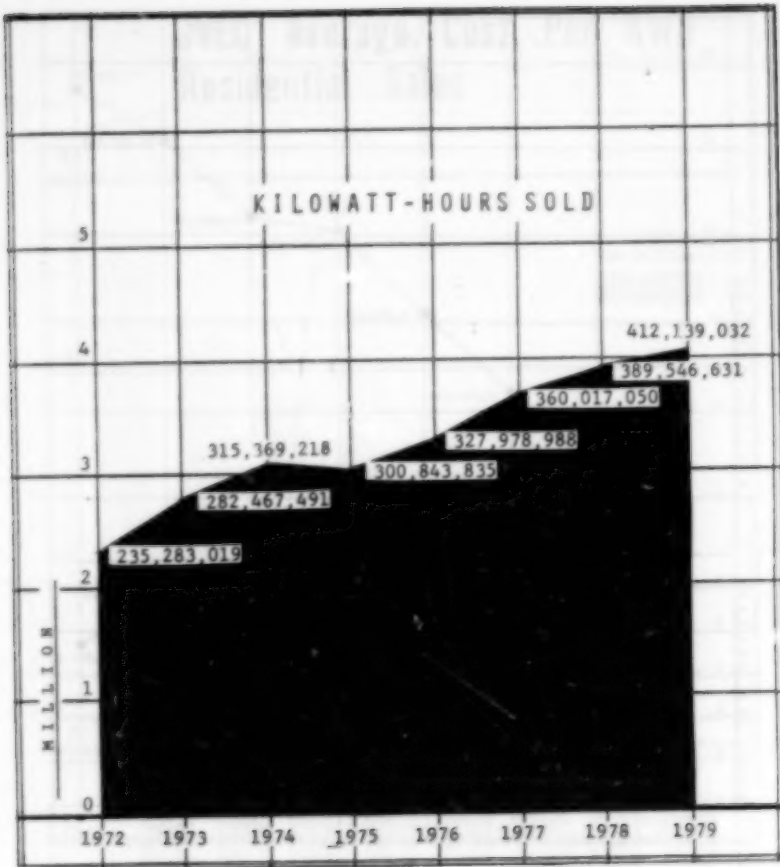


EXHIBIT 6

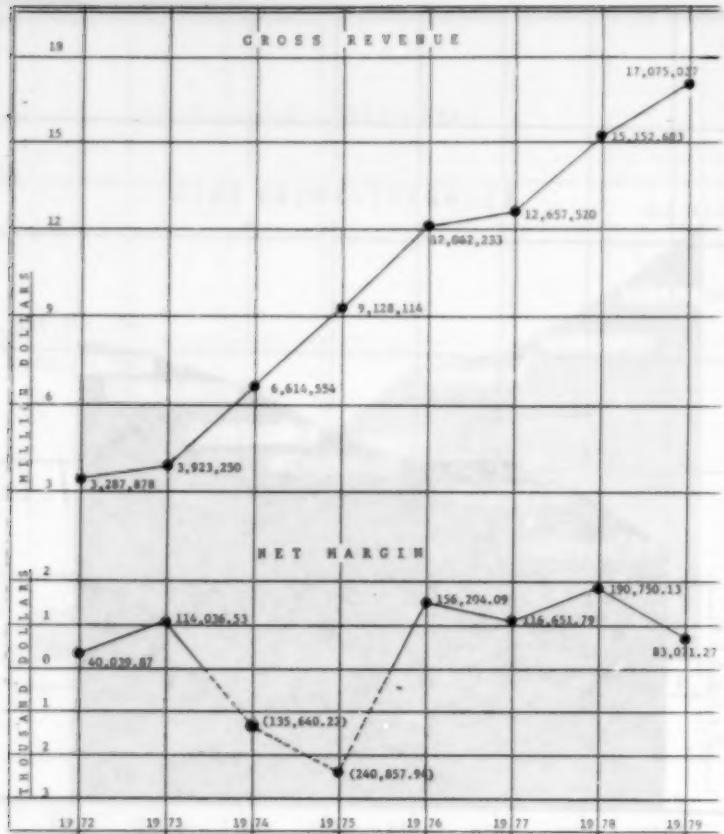


EXHIBIT 7

GVEC Average Cost Per KWH Residential Sales

5¢

Basic Rate



4¢

3¢

2¢

1¢

0

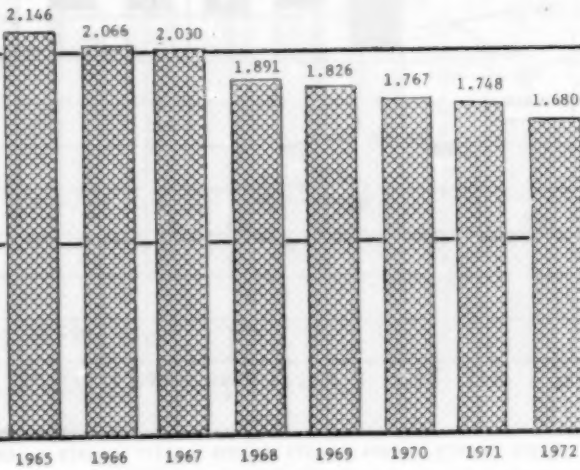
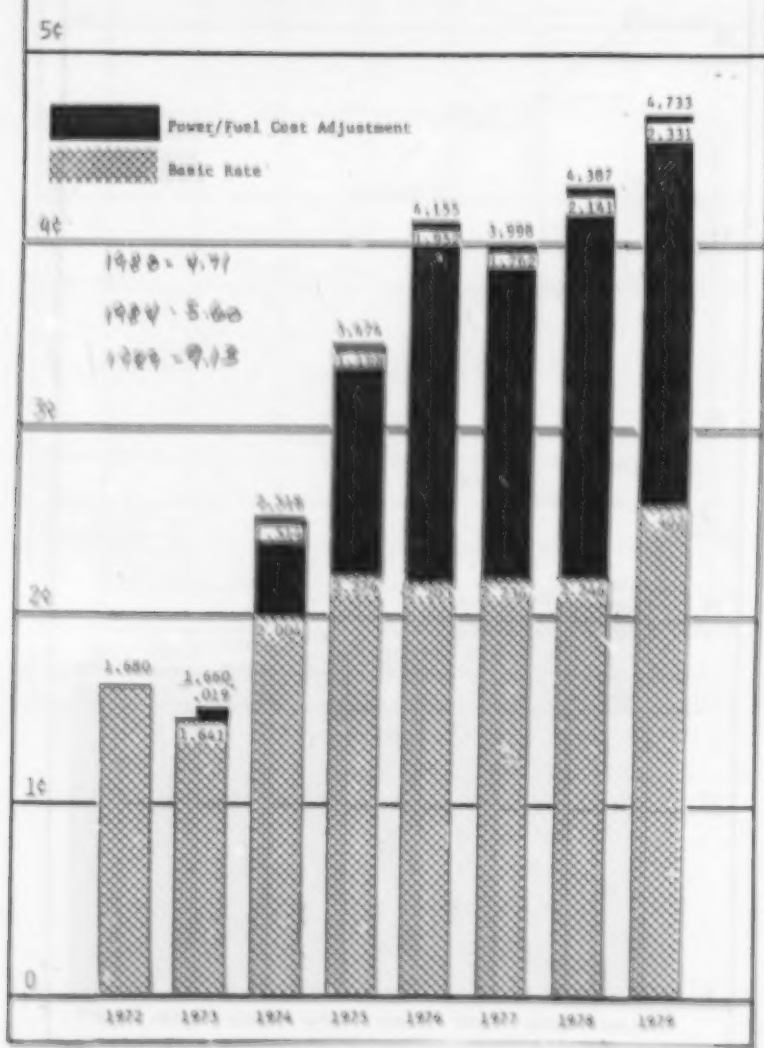
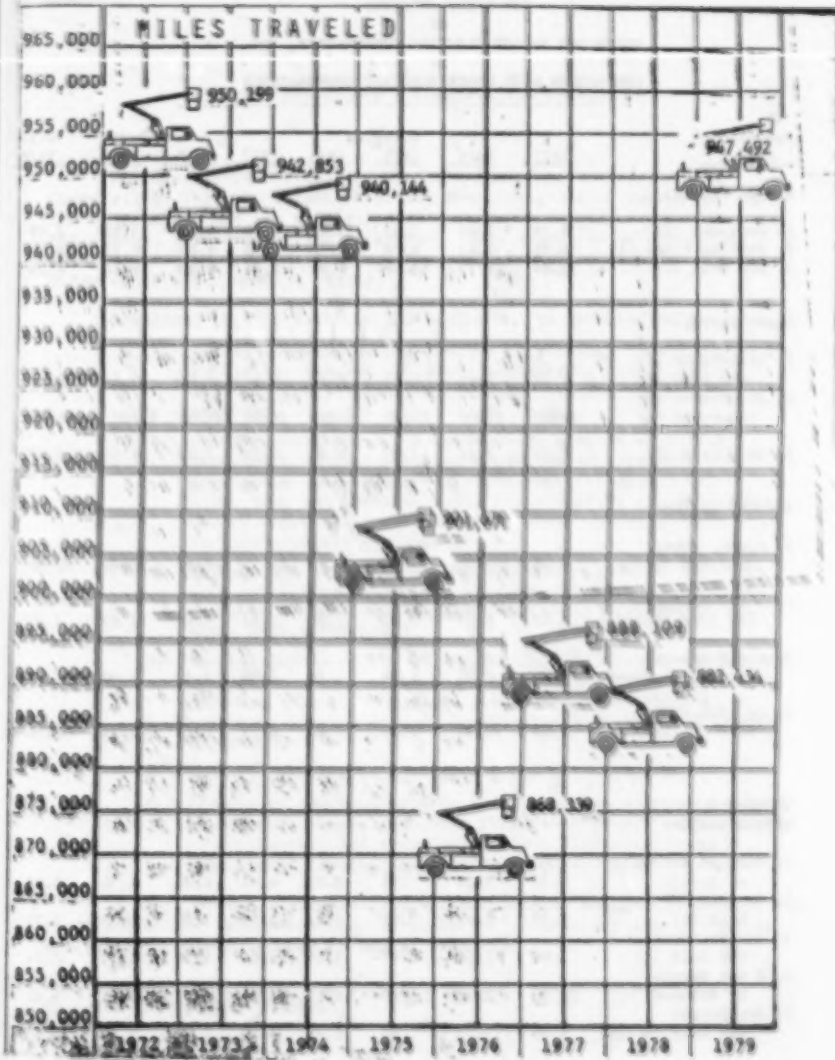


EXHIBIT 8

GVEC Average Cost Per KWH Residential Sales



MILES TRAVELED



RAT RATIO ANALYSIS
of
GULF VALLEY ELECTRIC COOPERATIVE, INC.
in
COMPARISON WITH OTHER ELECTRIC COOPERATIVES

Comparison	1972		G.V.E.C.				Texas	G.O.
<u>Area</u>	<u>1972</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1978</u>	<u>1978</u>
ANNUAL GROWTH:								
1. Consumer (X)	9.78	8.03	2.03	3.01	3.06	4.08	3.92	0.00
2. Utility Plant (X)	0.83	7.43	0.78	7.18	7.33	8.00	9.12	0.42
3. KWH Sold (X)	20.04	11.73	(4.89)	0.07	0.01	0.23	9.48	0.58
PLANT RATIO:								
1. Investment per KWH Sold (c)	3.73	5.51	0.09	0.18	0.06	0.06	20.47	0.01
2. Investment per Consumer (c)	\$1070	\$1100	\$1180	\$1210	\$1280	\$1300	\$1290	\$1390
3. Dep. (ann) (c)	0.53	7.00	7.03	0.00	0.02	7.18	22.17	0.15
EXPENSE RATIO:								
1. Purch. Power Cont./KWH (Mills)	6.38	13.36	21.48	28.17	25.26	26.02	26.36	24.36
2. O & M Expense KWH Sold (Mills)	1.04	1.07	1.30	1.04	1.08	1.27	2.67	2.07
3. O & M Expense % of Total Plant	1.02	2.30	2.08	2.04	2.09	2.10	2.42	2.08
4. Op. Exp./KWH Sold (Mills)	2.18	3.40	3.93	6.06	3.78	6.12	11.20	10.63
REVENUE & RETURN RATIO:								
1. Rate of Return on Equity	7.80	2.15	.93	8.05	6.62	6.20	6.31	6.43
2. Revenue KWH Sold (c)	1.38	2.09	3.02	3.67	3.51	3.89	4.33	3.79
3. Rev. Residential KWH Sold (c)	1.66	2.32	3.47	4.16	4.00	4.39	4.53	3.90
4. % Net Margin of Revenue	11.93	1.33	1.40	4.42	4.24	4.17	5.81	5.81
5. Net Margin KWH Sold (Mills)	1.65	.73	.50	1.74	1.33	1.69	3.17	2.63

EXHIBIT 11

ENERGY EFFICIENCY & CONSERVATION POLICY

Whereas, it is the objective of the Guadalupe Valley Electric Cooperative, Inc., to establish policy concerning use of energy by the cooperative and its members, particularly in regard to effectiveness, efficiency, and conservation of energy. This objective is consistent with the utility responsibilities of a full-service cooperative and its prime concern for members' needs.

Resolved, that it shall be the policy of the Cooperative to:

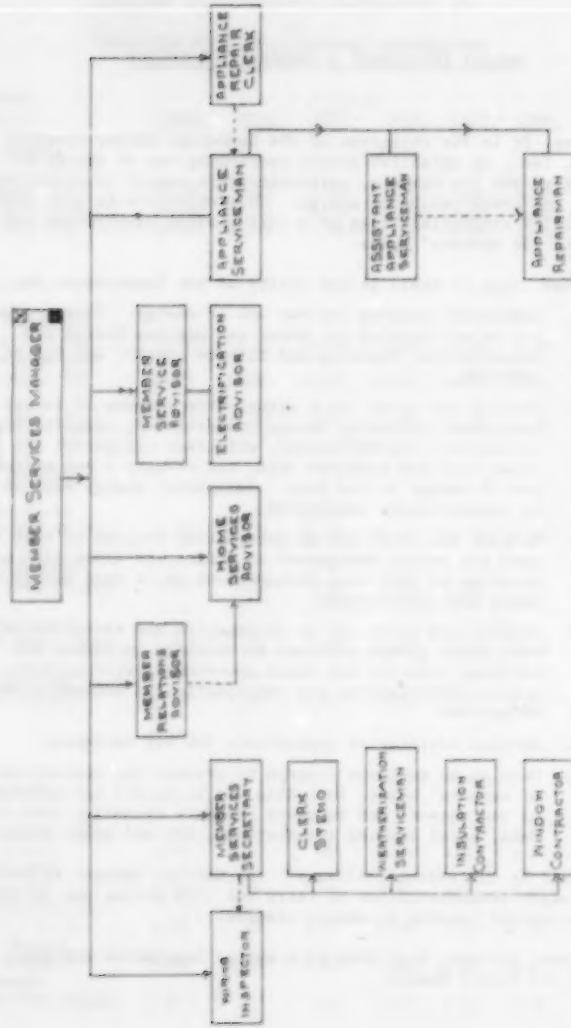
- A. Constantly examine its own use of energy. This includes, but is not limited to, plant engineering design and construction, lighting and climate control and use of vehicles.
- B. Develop and carry out a system-wide program of energy management including energy conservation, adequate home insulation, weatherization, efficient irrigation and other farm and business uses, and effective and efficient use of energy in the home. Alternative energy sources will be appropriately considered.
- C. Develop and carry out an information program so that the need for energy management is understood along with understanding of what each consumer can do to meet energy use needs most effectively.
- D. Develop and carry out an information and education program with major groups involved in housing, including the building industry and local government organizations, to assure understanding and coordination in methods of energy management.
- E. Develop training as appropriate for all employees.
- F. Develop an adequate program to promote the weatherization of members' homes, including the selection and monitoring of contractors and securing adequate financing from the FMA, local lending institutions, CFC and other sources.

It shall be the responsibility of the General Manager to develop work plans and budget recommendations to carry out this policy and to develop appropriate control reports to assess results.

Resolved, further, that this is a policy resolution and shall be included in the Policy Manual.

September 27, 1977

A LOOK AT THE MEMBER SERVICES DIVISION



———— PRIMARY LINE OF AUTHORITY ■ MEMBER OF MANAGEMENT ADVISORY COUNCIL
 - - - - - DELEGATED LINE OF AUTHORITY ■ SALARIED EMPLOYEES

Summary of
Energy Conservation Work Plan
and Budget

Borrower: Greenidge Valley Electric Cooperative, Inc.

No. of Consumers: 19,496 *

Date: March 6, 1980

() Check Where Appropriate

	Present	Proposed
<u>1. Conservation in Borrower's Facilities</u>		
A. Amount of Capital Expend.: Last Year \$2,200; This Year -0-	-	-
B. Amount of Annual Savings: Last Year \$4,670; This Year -0-	-	-
C. Solar Applications	-0-	-0-
D. Lighting	500	500
E. Thermostat Control	200	200
F. Weatherization of Facilities	1,100	-0-
G. Vehicles	-0-	-0-
H. Heating/Cooling System Modifications	-0-	-0-
I. Employee Education	200	200
J. Other	-	-
<u>2. Consumer Education</u>		
A. Local Newspapers	4,500	5,000
B. TV	-0-	-0-
C. Radio	5,796.05	6,100
D. Meetings with Consumers	4,000	10,000
E. Display/Demonstration/Films	4,500	5,000
F. Bill Stuffers/Newsletters	2,761	3,000
G. Other: GVEC Review	17,074	18,000
<u>3. Technical Services</u>		
A. Energy Audits (No.: Last Year: 970 Computer & 50 On-Site)	-	-
(No.: This Year: 300 Computer & 300 On-Site)	-	-
B. Assist in Arranging to have Suggested Measures Installed	49,000	51,550
C. Assist in Arranging Financing	20,000	21,100
D. Advise on Appliance and Equipment Efficiency and Suggested Usage Patterns	18,000	20,600
E. Assess Usefulness of Solar Applications	-0-	-0-
F. Other	-	-
<u>4. Participation with Other Organizations</u>		
A. Building Contractors	-	-
B. Weatherization Contractors	189,058.62	170,000
C. State Energy Offices	1,500	1,500
D. Statewide/NRECA	-0-	-0-
E. C & T	500	500
F. Local and/or State Extension Service	-	-
G. Other	-	-
<u>5. Resources Dedicated</u>		
	Previous Year	Proposed Year
A. Dollars		
1) Personnel	\$ 98,630	\$ 103,100
2) Information	17,875	62,100
3) Capital Expenditures	11,000	11,000
4) Supervision	11,200	17,600
5) In Cooperation with Others	-0-	-0-
6) Other	-	-
TOTAL:	\$138,705	\$193,800
B. Staff Time		
1) No. Employee Hours	18,270	19,011
2) Names of full and part-time energy conservation staff:	Major Assignments	

* GEA Form 7, Part D, Total No. Receiving Service

* Represents expenses incurred. Expenses were offset by income of \$204,629.43 which resulted in a net income of both programs of \$15,771.01.

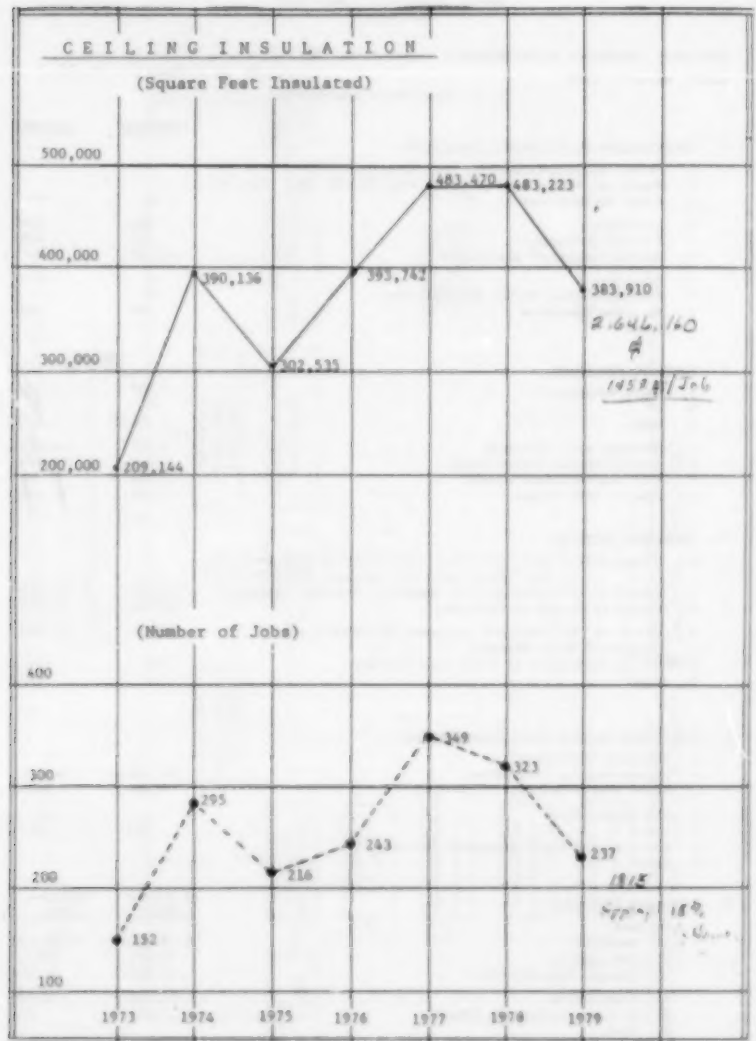


EXHIBIT 15

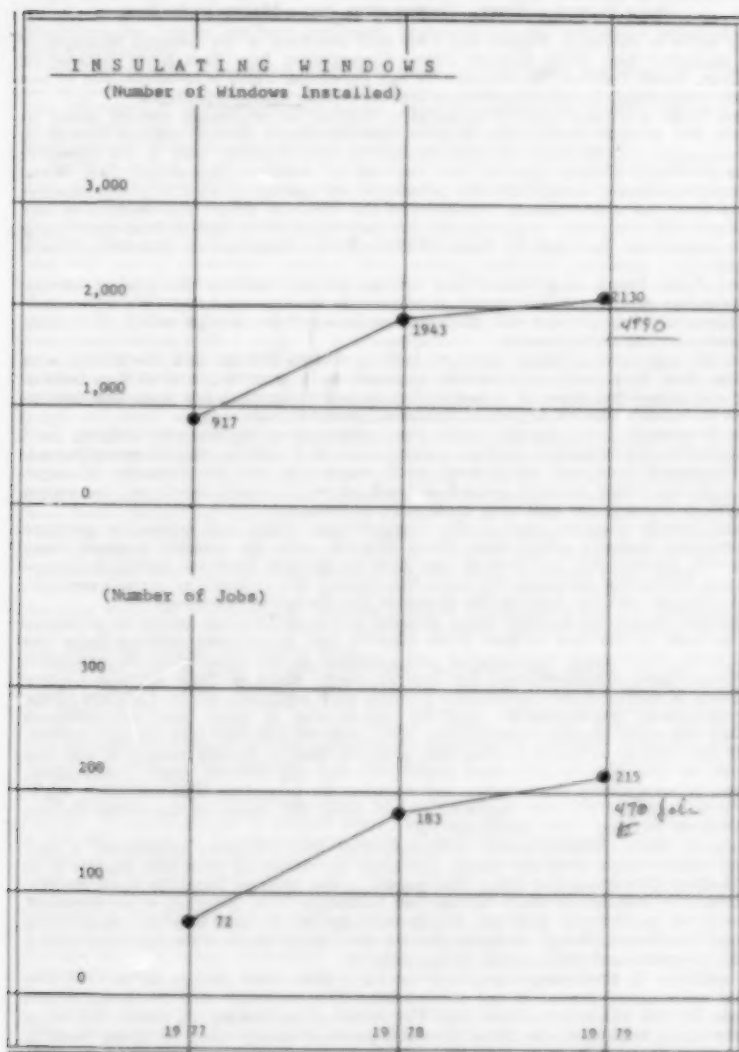


EXHIBIT 16

STATEMENT OF JEFFREY L. NELSON, ASSISTANT TO THE GENERAL MANAGER, EAST RIVER ELECTRIC POWER COOPERATIVE, INC., MADISON, S. DAK.

My name is Jeffrey L. Nelson and I am staff assistant to the General Manager of and represent East River Electric Power Cooperative, Inc. (East River) located in Madison, South Dakota. The purpose for my appearing today is to advise you of our efforts concerning energy conservation and renewable energy resources.

East River is a rural electric cooperative that serves wholesale electric power to twenty five member distribution systems that ultimately provide electric service to approximately 62,000 rural services located in forty counties east of the Missouri River in South Dakota and in five counties in western Minnesota. East River presently purchases about forty-four percent of our member's electric power requirements from the hydro electric resources of the Missouri River. The balance of our member's electric power requirements are purchased from lignite-fired generating units owned and operated by Basin Electric Power Cooperative, Bismarck, North Dakota.

East River has a long record and serious commitment to the goal of energy conservation and the development of renewable energy resources. We appreciate this opportunity to present this statement outlining those actions which we believe demonstrate that commitment.

We are cognizant of some persons, both in South Dakota and elsewhere, who criticize East River and rural electric cooperatives in general for what they believe to be our misguided sense of responsibility in providing what has been and continues to be reliable electric service at the lowest possible cost.

We frequently hear charges made that cooperatives oppose rate reform, load management, decentralized electric systems, control by public utilities commissions, environmental laws and regulations, while supporting the development of major hydro electric water projects labeled as 'pork barrel'. I would like to set the record straight concerning our efforts in these various areas.

I will briefly describe some of the energy conservation and renewable resource development projects which East River Electric with its member systems have supported, encouraged and worked very hard to develop. Recently energy conservation and renewable resources has been the banner of a crusade by certain environmental groups offering these as the salvation for our energy problems.

However, many times these same persons and organizations refuse to recognize that at least in the case of East River Electric and its member systems there has been much effort made encouraging and assisting in the installation of insulation and encouraging weatherization for over 25 years. Many of these perhaps sincere crusaders of energy conservation now criticize such programs as the Farmers Home Administration weatherization program which was to have been administered through the rural electric cooperatives. That program has had very limited success. What they choose to ignore is that that program died of its own weight in that the criteria for obtaining a loan were prohibitive and the interest rates unattractive. Instead of recognizing that reality and working for programs that are more workable it is easy and without responsibility to point the finger at the rural electric cooperatives and say, "you did a poor job".

Recently Rural Electrification Administrator, Bob Feragen, announced a new energy conservation program which will allow for deferring principal payments to outstanding REA loans and using that money in low interest loans for rural electric consumers to weatherize their homes and buildings. This program is an excellent step and we believe will gain the widespread support of rural electric cooperatives through the United States. In South Dakota we already sense a strong commitment for this program and look to good things from it.

In addition to promoting insulation we have done such things as in 1978 five typical uninsulated homes in our service area were selected with the homeowners consent for full insulation at our cost. The terms of our insulating these residences was for them to give us the three previous years of energy used for space heating and cooling use and the same data after we insulated. The results of this demonstration program have been exceptionally successful and widely distributed. It is typical of promotional efforts we have made for insulation for over 25 years.

The co-banner of the energy "reformers" is solar energy. East River has been a leader in the development of solar energy in South Dakota. Beginning in 1973, before it was "fashionable" to do so, East River and one of its member systems, Kingsbury Electric Cooperative, made a significant contribution to the development of solar energy by pioneering, along with the engineering extension service at South Dakota State University (SDSU), Brookings, South Dakota, the first successful solar crop dryer. This effort directly contributed to what now is commercially available solar crop dryers on the market. An important point in the development of that project is that the financial commitment made by East River and Kingsbury Elec-

tric was modest. The reason it was modest was that the first crop dryer used such things as used printing plates and other readily available low cost materials. Since that time the system has been perfected, improved but still remains a relatively low cost installation.

Another equally pioneering effort was made by East River beginning in 1976 and accomplished at very minimal cost, installing a solar collector to assist and improve the efficiency of a standard heat pump. That demonstration project, like the solar crop dryer, has resulted in considerable interest and we believe in the further development of the commercial use of solar assisted heat pumps.

Another aspect of solar research that East River has pioneered is in wind generation. In 1976 East River along with the South Dakota State University and one of our member systems, Beadle Electric Cooperative, was successful in competing for the installation of meteorological monitoring equipment at a site near Huron, South Dakota that has great potential for the development of large scale wind energy. Our site was one of seventeen selected from among sixty-five proposals submitted by various utilities throughout the United States. Since 1976 we have collected wind data, at our cost and provided it to the Department of Energy for broadening the data base of the federal wind energy program. In the last several weeks we have been negotiating with a major U.S. manufacturer for the possibility of installing a commercial wind farm, utilizing large wind turbine generators at that site. The attention, visibility and recognition that our efforts in wind research have brought to South Dakota have certainly been the foundation for renewed interest in both large and small scale utilization of this renewable resource.

In terms of promoting the most efficient use of space heating modes, we have for over 15 years encouraged the use of electricity for space heating. This is consistent with our belief that we need to use our liquid fuels for mobile applications. Our major emphasis has been on the installation of the energy efficient heat pump. We have been conducting experimentation for the last year with the use of a heat pump working in conjunction with a water heater, allowing waste heat to be captured for the purpose of heating water. More recently we have been promoting the use of the "geothermal" heat pump, or sometimes referred to as the water heat pump.

In 1978 we agreed to assist in sponsoring a demonstration project with one of our member systems, Bon Homme-Yankton Electric Cooperative, for the installation of time of day meters which are being used for determining the applicability of time of day metering within our service area.

Our load management efforts instituted two years ago center on our "Energy Alert Program". Our "Energy Alert Program" solicits voluntary load management by encouraging our consumers to use only essential electric equipment during those times when we are experiencing high electric demands on our system. The result of this on-going program has been a significant damping of our peak demand for power which has contributed materially to the reduction of peak load growth in our area in the last two years.

In January, 1978, well before there was any significant recognition of the potential for the development of alcohol fuels, the East River board of directors allocated a \$30,000 grant to South Dakota State University to conduct research on the potential for using waste organic material in the production of alcohol fuels in a farm sized alcohol production unit. That \$30,000 grant was supplemented by an additional \$10,000 from the National Rural Electric Cooperative Association and has resulted in South Dakota providing some of the foremost research in the development of alcohol fuels. In keeping with our commitment to reducing dependence on foreign oil and using renewable resources, East River Electric became the first major business in the upper midwest to convert its entire fleet of vehicles from gasoline to gasohol in February of this year.

We are presently working on a demonstration vehicle to use 100 percent alcohol. This demonstration follows the use by East River of an electric car beginning in 1961 until two years ago when we retired that vehicle to a local museum.

We will continue to call for the immediate development of major Federal water-projects such as the Gregory County Pumped Storage Unit. Thanks to the efforts of the South Dakota Congressional delegation, this project which would increase the power capacity of the Missouri River mainstem system by 58 percent (1180 megawatts), save over 2.4-million barrels of oil annually with minimal environmental or social disturbance has been included in the last two omnibus water bills before Congress. Unfortunately, the present status of that authorization which was included in H.R. 4788 of this Congress is languishing without action in S. 703 in the Senate Committee (Water Resources Subcommittee of Environment and Public Works Committee) awaiting the outcome of the Administration's headline attacks on the "pork barrel projects", ill-conceived concepts on cost sharing and the struggle

for the control of water project authorizations through the Water Resources Council. As the old saying goes, we know what it means to "fiddle while Rome burns".

As part of our recent efforts to update our projections for future power needs, the member systems of East River conducted a consumer survey. Of over 546,000 surveys sent, more than 40 percent were returned giving us a high degree of confidence in the results. The results of that survey in its entirety are attached to this statement, however, I would like to point out several important points.

First, of those who returned the survey over two thirds indicated that over the last two years they have made a direct weatherization improvement to their home. Additionally, within the next two years almost the same number indicated that they intend to install some additional weatherization project. We believe that to be a strong indication that the efforts that we have been making for the last twenty-five years are yielding positive results. An excellent question to ask then, is, why are the rural electric, particularly those in South Dakota, experiencing a continued high growth rate. part of the answer can be found in the survey responses that request the present type of space heating used. Almost forty percent of those who responded to the survey use oil as their primary source of space heating.

Coupled with the continued improvements in electrical devices that are bringing our agricultural community even higher production opportunities every day and the pressure of dramatically increased oil prices, almost all new construction is electric and many are adding supplemental electric heat or converting entirely to electric heat. This Committee should recognize the fact that the loads and requirements for electricity are a function of the demands made by the end user. Cooperative boards and management cannot and should not make these choices for the consumer. We have and will continue to make a conscious, deliberate effort to encourage the wisest and most efficient use of electric resources but in the final judgment the decision on energy use must be made by the consumers.

A significant problem for rural electric cooperatives is the tremendous and continuing increases to our rates much of which is a direct result of the significant revisions that were made to the Rural Electrification Act in 1973 after President Nixon tried through executive fiat to abolish the Rural Electric Act completely in late 1972. The Act that was reinstated in 1973 drastically curtailed rural electric cooperatives (with an average consumer density of 1.72 per mile in South Dakota) accessibility to moderately priced interest rates for capital. As a result, the interest costs alone are forcing electric rates to unprecedented levels and when coupled with depressed commodity prices and near 20 percent inflation much unrest among rural electric consumers is understandable. This comes at the same time there is tremendous pressure for additional commitments to energy conservation and renewable resources. It places rural electric cooperatives in a most difficult situation.

In 1978 the total expenditures of East River were \$17,610,837. Of that amount the "controllable" costs, in other words, those costs other than taxes, depreciation, interest, and purchased power, accounted for only twelve percent. In 1979 that "controllable" amount was eleven percent out of total expenditures of \$21,889,036. We expect that controllable percentage to continue to decrease. From these controllable dollars in 1978 and 1979 we paid \$427,662 in patronage capital credits and have paid another \$424,944 this year. It is from those controllable dollars that we must perform all alternate energy and conservation efforts that we are being asked to do. It is particularly frustrating to us to be asked to perform miracles with no resources and then, on the other hand, see efforts being made by the present Administration to provide \$10-billion in grant funds through the Power Plant Fuels Conservation Act of 1980, using dollars from the Windfall Profits Tax, to convert investor owned utility powerplants from oil and natural gas to coal. We support that goal but point out that while the rural electric cooperatives are being asked to raise money to conduct their alternate energy and conservation programs from their consumers or by borrowing money at interest rates that have raised from 2 and 5 percent in the '60s and early '70s to anywhere from 10 to 20 percent today, I believe you can see our source of frustration.

I recently testified before the National Alcohol Fuels Commission during a hearing held in South Dakota, chaired by Senator George McGovern on April 11, 1980. At that hearing I recommended to the Commission they consider the use of a direct interest subsidy for loans for the production of alcohol fuels patterned after Section 5 of the Rural Electrification Act of 1936. Section 5 allowed two percent loans to be made for terms of up to 35 years for rural electric consumers to purchase plumbing and electrical appliances and obtain wiring at the time that they received electricity in the '40s and '50s. In my opinion, it is this type of program that at a very moderate cost can provide the resources that will produce dramatic gains for alternate energy development. Certainly the tax credits and other incentives provided in the Windfall Profits Tax for alternate energy devices are useful and we support

them. However, this Committee must recognize that unless the rural electric are provided at least modest resources, the accomplishments achieved will be necessarily limited.

East River is proud of its record of accomplishments in alternate energy and conservation. We have accomplished these efforts with comparatively modest resources, stewarding the monies collected from our consumers wisely and effectively. We will continue to do so.

In summary I emphasize these points:

(1) Many rural electric cooperatives have been and are providing aggressive leadership in both energy conservation and renewable energy resource development with very modest resources.

(2) While rural electric cooperatives must be leaders in promoting energy conservation and renewable energy resource development, the final decision on energy use rests with the ultimate consumer.

(3) Rural electric cooperatives are being criticized for dramatically raising rates due largely to uncontrollable costs while at the same time being urged to devote more dollars to energy conservation and renewable energy resource development.

If conservation and alternate energy are to be the centerpiece for the future of the rural electric cooperatives, we cannot be expected to accomplish miracles with promises and the talk of what a good idea it is. The realities are that inflation is affecting us as it is affecting all segments of our economy. Interest rates are forcing our rates up despite significant efforts to cut costs. We have seen serious cost cutting efforts immediately wiped out and reversed by inflation, interest rates, state severance taxes, and environmental requirements. Caught in the cross fire between those who are justifiably concerned about increased rates and those who feel more dollars need to be allocated to conservation and alternate energy programs, the cooperatives are caught in the middle. We accept that as a major challenge and will continue to provide progressive leadership in conservation and alternate energy development. We only ask your help in continuing that effort.

We appreciate the opportunity to have appeared before this subcommittee to give you a better understanding of our philosophies and efforts to further the development of conservation and alternate energy sources.

STATEMENT OF JAMES L. GRAHL, GENERAL MANAGER, BASIN ELECTRIC POWER COOPERATIVE, BISMARCK, N. DAK.

Thank you, Mr. Chairman and members of this Committee for the opportunity to report on the activities by Basin Electric and its member cooperatives with respect to energy conservation.

Basin Electric Power Cooperative, with headquarters in Bismarck, North Dakota, is a regional wholesale power supplier for 118 relatively small rural electric cooperatives in the Upper Great Plains. These consumer-owned cooperatives provide electric service to approximately 300,000 rural families, farms, ranches and businesses . . . or to about one million people . . . in the Missouri River Basin states of North and South Dakota, Montana, Wyoming, Colorado, Nebraska, Iowa and Minnesota. (Exhibit 1.)¹

The Board of Directors of Basin Electric, elected from the consumer membership of the member cooperatives, is made up entirely of farmers and ranchers who by the nature of their occupation are deeply concerned about the conservation of our air, land, water and coal resources and about using these resources prudently in providing electric service to the sparsely settled rural areas of the Great Plains.

As a major regional power supplier, Basin Electric's planning, construction and operating activities strive for maximum economy in the use of all resources through coordination with the Cooperative's member systems and also with other power suppliers in the region . . . private, public and Federal.

The combined service areas of the Basin Electric member systems . . . more than 450,000 square miles . . . and the concepts on which this regional power supply system was developed incorporates in its operation the conservation and optimum utilization of natural resources.

Each year the membership of Basin Electric has at their annual meeting affirmed their support for energy and resource conservation policies. In 1967, in a Statement of Ideals and Objectives, the membership declared . . . "that the benefits of the development of our national resources should accrue to the people . . . (by) establishing and maintaining programs and policies to protect the public interest in the maximum multi-purpose development, conservation and utilization of our water and power resources." (Exhibit 2.)

¹ Exhibits 1-17 referred to in this statement will be retained in the committee files.

Years before concern for the environment became so popular, the members of Basin Electric said in this 1967 statement . . . "that a clean and healthy environment which we all need and enjoy must be maintained and that the energy industry must do all that is feasible to minimize negative impacts on the environment."

The members of the Cooperative also adopted the objective of . . . "fully coordinating the operations of thermal generating plants with the Federal hydro system so as to make optimum use of the region's water and energy resources while maintaining an economic and adequate power supply."

These goals and objectives formally adopted by the members actually have been policies governing the operation of Basin Electric Power Cooperative from its inception in 1961.

In 1962, Basin Electric became the first utility in the country to require its coal supplier to rehabilitate strip-mined land. During the next few years, Basin Electric urged the North Dakota Legislature to enact laws requiring the reclamation of strip-mined land and protecting the air and water against industrial pollution, and these efforts were successful.

In 1963, rural electric and public power leaders in the region executed a landmark power pooling and joint planning agreement between the Department of Interior (Bureau of Reclamation) and the region's rural cooperative and municipal electric systems providing for the formation of the Missouri Basin Systems Group (MBSG) and the establishment of a region-wide Joint Transmission System (JTS).

The Systems Group has made possible the best use of power supply facilities and energy resources in the region and the achievement of financial savings for consumers through the coordinated planning and operation of hydro and thermal generating plants and transmission facilities in a regional joint power supply program.

The Joint Transmission System consists today of more than 8,000 miles of high voltage transmission lines. Operated by the Western Area Power Administration (WAPA), this transmission system has been planned and built jointly and is jointly used by the Western Area Power Administration and the region's rural electric cooperatives and other consumer-owned electric systems. Duplication of transmission facilities thus has been avoided, with substantial savings in dollars, land and other resources.

An agreement between Basin Electric and the Bureau of Reclamation in 1968, expanding on the 1962 agreement, provided for the purchase by Basin Electric of 280,000 KW of hydroelectric peaking capacity generated at Federal dams on the Missouri River. By using this hydro capacity, Basin Electric has been able to minimize its use of oil in our oil-fired peaking plant.

This arrangement and others between Basin Electric and the Bureau of Reclamation constitute a program of "hydro-thermal integration," making optimum use of both hydroelectric and thermal resources and resulting in efficient and conservative use of the region's resources of land, water and coal in supplying electricity to the region's rural areas.

Because the area served by Basin Electric's member systems reaches from Iowa to central Montana and from southern Nebraska to the Canadian border, the Cooperative is able to use its coal-fired generating capacity in combination with Federal hydroelectric power and the Joint Transmission System to meet peak power requirements in the south in the summer and peak requirements in the north in the winter. This diversity allows us to make maximum use of generation and transmission facilities and avoid having power capacity excess to our members' estimated needs. This capability has saved thousands of rural consumers millions of dollars in the form of lower power bills.

The numerous small rural electric systems joined together to organize Basin Electric in order to take advantage of the "economics of scale" and build a relatively small number of larger generating plants instead of numerous small and inefficient units. A recent study has again confirmed that 500,000 kilowatt coal-fired generating units are more economical for the cooperatives and their consumer-owners than the construction of ten scattered 50,000 kilowatt units. The larger units cost less per kilowatt of capacity and use less coal per kilowatt hour produced.

An earlier study by the Missouri Basin Systems Group in 1965 showed that a single 500,000 kilowatt plant would require 20 percent less capital investment than would ten 50,000 kilowatt units and achieve savings of 12 percent to 20 percent in operating costs. (Exhibit No. 3)

In addition, the single unit would require 40 percent less land for a plant site and 20 percent less coal to produce the same amount of electricity. This represents a major resource conservation program in a sparsely settled region where strenuous efforts by many people were required to put together a large enough group of cooperatives to justify larger units and then reach agreement with the Federal government on an extensive joint transmission system.

Today Basin Electric's thermal power generating capacity totals more than 700,000 kilowatts. Our facilities include the 216,000 kilowatt Leland Olds Unit No. 1; the 440,000 kilowatt Leland Olds Unit No. 2; the 50,000 kilowatt William J. Neal Station (all in North Dakota and all lignite-fueled); and the 120,000 kilowatt oil-fired Spirit Mount Station peaking plant in South Dakota.

Combined with winter peaking capacity of 280,000 kilowatts of hydroelectric power purchased from the Western Area Power Administration and short-term purchases from others, Basin Electric has a regional power supply capacity of over one million kilowatts.

The agricultural region served by Basin Electric's members has experienced rapid economic expansion in recent years due chiefly to increased agricultural production, the development of plants to process some of this production, sharply increased oil production and expanded coal mining operations.

Consequently, our member systems have forecasted substantial increases in electric power requirements in future years and Basin Electric is presently engaged in the design and construction of 1.5 million kilowatts of additional generating capacity to meet the members' projected requirements through about 1986.

Basin Electric and its member systems were organized by rural consumers to provide themselves with an essential service—electricity. While this remains the basic purpose of these cooperative organizations, they have also had the associated responsibilities of fulfilling that purpose in a socially acceptable manner; to protect the environment in which their consumers live and work and to provide for the wise use and conservation of resources.

Basin Electric therefore has sought to promote energy conservation by its own operations as well as working with its member systems on conservation activities.

In addressing the need for a comprehensive energy conservation effort, the Board of Directors of Basin Electric adopted a specific policy in 1978 on "Conservation of Energy and Load Management", defining problems associated with the production of electric energy, recognizing a number of possible alternatives and indicating areas of possible action, and urged the member systems of Basin Electric to adopt policies for conserving energy and coordinating load management. (Exhibit No. 6.)

In May, 1978, the Basin Electric Board of Directors established a committee of member representatives on Alternate Energy Sources and Conservation to help develop a coordinated program to encourage conservation and to investigate alternative energy sources that could benefit the member systems' rural consumers.

This advisory committee promptly initiated an Energy Audit Technician Training Course to train local cooperative personnel in conducting residential energy audits for rural electric consumers. This program is a coordinated effort between Basin Electric and its member systems, the National Rural Electric Cooperative Association (NRECA) and several statewide associations of rural electric cooperatives in the Basin Electric service area.

To date six intensive, four-day auditor training sessions have been conducted in Montana, Iowa and North and South Dakota and over 190 rural electric personnel have been trained. This number includes at least one representative from each of the 110 member distribution cooperatives of Basin Electric. These people are currently conducting energy audits and advising home-owners on how to insulate their homes and use less energy. (Exhibit 7.)

The program also provides information on other conservation possibilities such as solar heating, wind turbine generation, irrigation peak demand reduction and small-scale hydroelectric power facilities.

Basin Electric's headquarters building was located, oriented and designed to demonstrate the possibilities for maximum energy efficiency. It is heavily insulated, built into a hillside and faces southeast in order to gain maximum exposure to the sun during the winter months. The heating system uses passive solar energy, body, mechanical and lighting heat and energy conservation through energy reclaim and storage techniques. It uses about half as much energy for heating, lighting and cooling as a conventionally designed building. (Exhibit 8.)

In 1977 the Department of Energy selected the building for a solar heating demonstration project and installation of the system was completed in October of 1978 at a cost of more than \$400,000. Ninety percent of the funds were provided by the Department of Energy.

The solar demonstration system was incorporated into the existing heating system of the building. During the 1979-80 winter season, the solar system supplied approximately 15 percent of the total heating requirements of the building.

Basin Electric also joined with other utilities in the installation of a demonstration solar collection system for hot water heating for a bath house in a housing subdivision used to house construction workers and their families.

A joint load management study was recently completed by Basin Electric and one of its larger member systems, Central Power Electric Cooperative at Minot, North Dakota, to measure various aspects of a selected sample of electrical loads. Measuring devices recorded the time that peak loads occurred and their duration, the times that off-peak hours occur and other load characteristics.

The results of the study are now being published for final study and review to determine to what extent load management is practical and what types of loads are most feasible to manage in this rural area. This information will be provided to our other members.

Basin Electric also has a biomass project underway in conjunction with another member system, Verendrye Electric Cooperative, which expects to supply power to a proposed sunflower oil processing plant to be located near Velva, North Dakota. Basin Electric has been experimenting with using the sunflower seed hulls as fuel in our power plant (the Neal Station) at Velva and is currently negotiating arrangements to do so with the oil processing company.

The tests conducted at the Neal Station by Basin Electric staff, consultants and officials of the Department of Energy indicate that sunflower hulls can be successfully pulverized and burned in the power plant boiler in combination with lignite. This will make use of a waste product, reduce the consumption of lignite, and provide process steam to the oil processing plant on a most economical basis, assuming contract negotiations are brought to a satisfactory conclusion.

Last month Basin Electric applied to the Department of Energy to fund a feasibility study for a cogeneration grain alcohol plant at the site of the Laramie River Station power plant which we have under construction in Wyoming. The Cooperative proposes to investigate using steam, electricity and cooling water from the power plant to supply a plant for the conversion of feed grains into anhydrous fuel grade ethanol.

Last year, Basin Electric, the Platte County (Wyoming) Board of Commissioners and the Old West Regional Commission financed a joint study on low-grade heat utilization at the Laramie River Station. The study indicated that the greatest potential appears to be in horticultural applications . . . specifically in raising commercial quantities of flowers and certain vegetables. We now will try to interest some company in using low-grade heat from the power plant for these purposes.

At the Cooperative's Leland Olds Station in North Dakota, a fish farm utilizing warm water from the power plant has been in operation since 1977. Basin Electric has contracted with a local fish farmer to raise rainbow trout for commercial sale in ponds located adjacent to the power plants, using warmed water from the power plant cooling water discharge.

As a result of the rapid weight gains experienced by the fish in the initial project, the Cooperatives Board of Directors has approved the expansion this summer of the fish farm to include eleven ponds capable of producing 125,000 pounds of marketable rainbow trout per year.

Employees at the Basin Electric's headquarters building are operating a fleet of six 12-passenger vans as part of an employee van pooling program that has been underway since 1977. The Cooperative was the first employer in North Dakota to initiate an industrial van pooling demonstration project conducted by the State Highway Department under the North Dakota Energy Conservation Plan. Seventy-two employees are participating. The van pool saves about 12,000 gallons of gasoline per year and removes about 60 vehicles from city streets and the Cooperative's parking lot. (Exhibit 11.)

Approximately six percent of the fly ash collected at Basin Electric's Leland Olds Station in North Dakota has been marketed over the years as an ingredient in highway surfacing materials and other products. Fly ash is a powdery particulate waste product of coal combustion. We plan to expand our efforts to sell this waste product for useful purposes.

Basin Electric was one of the first utilities to initiate extensive testing programs using a dry system for "scrubbing" or removing sulfur-dioxide at coal-fired power plants. Through joint efforts with other utilities and equipment manufacturers, dry scrubbing technology has been improved and the new technology will be used in full-size large scrubbers at the Laramie River Station in Wyoming and the Antelope Valley Station in North Dakota.

In recognition of this achievement, the President's Council on Environmental Quality (CEQ) and the Environmental Industry Council, at their annual meeting in Washington, D.C. last February presented Basin Electric with an Award of Excellence in Air Pollution Control for outstanding technological achievement and leadership in pollution abatement.

This new technology will not only serve the purpose of attaining cleaner air but will cost much less and will consume less water and electric power to operate than do the conventional wet scrubbers employed today.

In 1975 Basin Electric signed an agreement with American Natural Gas Company (ANG) of Detroit, Michigan to share a common plant site, water intake, rail spur and operating facilities and a common source of lignite with the development of a lignite fired electric generating plant and a gasification facility in North Dakota.

The generating plant will provide electricity and emergency steam for the gasification process and will use lignite "fines," a waste product from the gasification process to meet approximately one-half of the fuel requirements for the power plant.

This joint project will achieve both conservation of resources and cost efficiencies which will save money for both electric and gas consumers.

Basin Electric's generating plant, the Antelope Valley Station, has been under construction for almost two years but the gasification facility has been delayed in the regulatory and permitting process. Sponsors of the gasification project hope to start construction yet this year.

The potential for the use of wind energy on a large scale is being pursued. Basin Electric is working actively with member systems in their efforts to initiate local wind generation projects.

The development of the Medicine Bow (Wyoming) wind project by the Department of Interior's Water and Power Resources Service has been supported by Basin Electric as an effort to have wind machines integrated with the hydroelectric system in order to maximize the usefulness of intermittent wind energy.

In 1979, more than 58,000 rural consumers who are the owners of Basin Electric's member systems attended annual membership meetings throughout the region. There they reviewed the operations of their cooperatives and adopted resolutions to guide their Boards of Directors and management in energy conservation and load management activities.

Other areas of specific energy conservation practices are being pursued by Basin Electric and its member systems during 1980. These include farm site energy audits, commercial audits, mobile home audits, intensified auditor training and the increased dissemination of informational materials on conservation. Member cooperatives have been developing solar crop drying techniques, voluntary "peak shaving" programs, heat pumps using well water as a heat source and other energy-saving techniques—and these efforts will continue.

Planning through cooperation among cooperative systems has proven to be uniquely effective since the beginnings of the rural electrification program. Basin Electric has approached energy conservation through cooperation . . . through the endorsement, involvement and support of its member systems.

The Cooperative has responded to its members commitment to resource conservation by engaging in joint power planning and participation in joint power supply projects . . . by attaining high power plant production efficiencies . . . by conducting studies and experiments to develop new operating methods and practices . . . by incorporating designs for cogeneration and waste product utilization . . . and by engaging in specific consumer energy conservation programs.

The ability to survive on the part of the farmer-rancher owners of the members systems of Basin Electric is currently under a serious strain caused by high interest rates, low farm prices and high operating costs.

All proposals for energy conservation must, therefore, be carefully scrutinized so as not to further burden the consumer. Once a technique is proven practical, however, it will be and is pursued with diligence by Basin Electric and its member rural electric cooperatives.

Basin Electric also believes that a sound energy conservation program should be an integral part of a national energy policy aimed particularly at the saving of precious liquid fuels for such areas of use as agricultural production and transportation.

We support and commend the Rural Electrification Administration (REA) for the initiatives taken to provide policy direction and financial assistance to rural electric cooperatives as new energy conservation policies and programs are put in place.

The proposals of the National Rural Electric Cooperative Association (NRECA), we believe, merits the support of this Committee and the entire Congress of the United States in order to give the nation's rural electric cooperatives the opportunity and ability they need to work with their consumers in a continuing energy conservation effort.

Thank you, Mr. Chairman and members of this Committee, for the opportunity to make this presentation.

BASIN ELECTRIC POWER COOPERATIVE

Basin Electric Power Cooperative, headquartered in Bismarck, ND, is a wholesale electric power generation and transmission cooperative for 118 rural electric cooperative systems in North and South Dakota, Montana, Wyoming, Colorado, Nebraska, Iowa and Minnesota. These consumer-owned systems provide electricity to more than 300,000 rural families, farms, ranches and businesses—about one million people—in a geographic service area encompassing more than 400,000 square miles. That represents a density of less than two consumers per mile of distribution line. (Exhibit 1)

As a major regional power supplier Basin Electric's planning, construction and operating activities aim for maximum economy and are closely coordinated with the Cooperative's member systems and other power suppliers in the region . . . private, public and Federal.

Basin Electric was organized in 1961 after the U.S. Bureau of Reclamation (now the Western Area Power Administration (WAPA) in the Missouri Basin) announced that increased demand for electricity in the region would by the mid-1960's outstrip the capacity of Federal hydroelectric facilities on the Missouri River.

While economic development in the Missouri River Basin Region had lagged behind that of other parts of the nation for many years, the expansion of agricultural and industrial pursuits to meet the country's growing need for food and fiber required more electric power. As people in the region took advantage of new employment opportunities, the job of supplying and upgrading electric service became more demanding.

After many months of study and planning, representatives of the region's rural electric cooperatives determined that there were three alternatives to provide their systems with electric power supply in the future. They could purchase power from investor-owned utility systems but with little or no control over wholesale power costs; they could individually or in area groups build small but inefficient local generating plants; or, they could pool their resources as well as their needs, form a regional bulk wholesale supply cooperative and construct large-scale, economical generating plants on or near the region's coal fields.

The rural electric leaders decided on the latter course and formed Basin Electric with the intent and purpose to "plan, design, construct and operate the necessary generation and transmission facilities to meet the rural electric cooperatives' future electric power requirements".

A number of factors led to the initial decision to build a generating station in North Dakota and all of the factors pointed to the promise of low-cost electric power. A major consideration was the abundance of low-cost fuel, lignite coal, which could be mined adjacent to the plant site, thus eliminating costly fuel transportation charges. Another major element, water for steam supply and cooling of the generating plant, was available from the Missouri River.

Basin Electric's 216,000 kilowatt Leland Olds Station Unit No. 1 was put into commercial operation on January 3, 1966, and since that time has been one of the most efficient producers of low-cost thermal power in the United States. The unit has had an average availability of almost 90 percent . . . 10 percent higher than the national average for thermal units of comparative size.

Operating under a cooperative philosophy and a membership policy of joint planning and regional coordination, Basin Electric and its member systems were involved in several major regional planning milestones during the 1960s. (Exhibit 2) Many of these milestones were realized by working through the rural electric regional policy and legislative arm, Mid-West Electric Consumers Association (MECA), and in partnership with the Federal government.

In 1962 rural electric leaders initiated a landmark power pooling agreement between the Department of Interior and the region's rural electric systems providing for the organization of the Missouri Basin Systems Group (MBSG) and the establishment of a Joint Transmission System (JTS).

Under this pooling agreement, MBSG was organized as an electric power pooling and planning organization not only for 120 rural electric systems, including Basin Electric and its member systems, but also for municipal electric systems, public power districts and the Bureau of Reclamation. The pooling group was formed in order to best utilize existing power supply facilities in the region and to achieve financial savings through the coordinated planning of generation facilities and transmission interconnections in future joint power supply programs. (Exhibit 3)

The Joint Transmission System was established under the pooling agreement in 1963 and today consists of more than 8000 miles of high voltage transmission line. Operated by WAPA, this transmission system is jointly used by the region's consumer-owned electric systems and serves as the backbone of the regional transmission grid system.

In 1962 Basin Electric signed a historic contract with the Bureau of Reclamation implementing provisions of the pooling agreement for the lease of surplus capacity in the Bureau's transmission system and for the sale by Basin Electric of surplus winter energy to the Bureau. The agreement also provided for guaranteed backup or reserves for the Cooperative's Leland Olds Station to be constructed in North Dakota.

An agreement reached by Basin Electric and the Bureau in 1968 expanded upon the 1962 agreement and provided for the purchase by Basin Electric of hydroelectric "peaking" capacity generated at Federal dams on the Missouri River to assure adequate power supply to meet the Cooperative's growing member system electric requirements between the time Leland Olds Unit No. 1 reached maximum production capacity in 1971 and the time the planned Leland Olds Unit No. 2 went into commercial operation in 1975. The agreement also provided for the purchase by Basin Electric of 230,000 kilowatts of Bureau hydroelectric winter "peaking" capacity through the year 1989, after the full capacity of the second unit of Leland Olds had been taken by the member systems.

These power supply arrangements between Basin Electric and the Bureau of Reclamation constitute what is called "hydro-thermal integration", making possible the optimum use of both hydroelectric and thermal facilities and resources and the conservation of the region's natural resources including water and coal. (Exhibit 4)

As part of the 1968 agreement with the Bureau, Basin Electric has constructed over 500 miles of high voltage transmission line (345 KV) from its Leland Olds Station and which is integrated into the Joint Transmission System.

As a regional power supplier, Basin Electric is able to use the Joint Transmission System to move electric power north and south on a seasonal basis to achieve load diversity. When summer loads occur in the southern part of the Cooperative's service area power is moved to the area from the north. When winter loads occur in the northern part of the Cooperative's service area power is moved to the area from the south. (Exhibit 5)

This seasonal and/or regional diversity capability has reduced the need for duplicate generating and transmission facilities and overuse of the region's natural resources. The ability to move large blocks of power throughout the region has also increased electric power supply reliability and has saved thousands of rural electric consumers millions of dollars in reduced power bills.

As a result of working through organizations they formed, such as MECA, MBSG and Basin Electric, the rural electric cooperatives and other small consumer-owned power supply systems in the region continue to realize the benefits and economies resulting from the development of a joint regional power supply program which makes possible the orderly development and wise use of the region's resources.

Today Basin Electric's thermal power supply totals more than 700,000 kilowatts. These facilities include the 216,000 kilowatt Leland Olds Unit No. 1; the 440,000 kilowatt Leland Olds Unit No. 2; the 50,000 kilowatt William J. Neal Station (all in North Dakota) and the 120,000 kilowatt, oil-fired Spirit Mound Station, a peaking facility located in South Dakota.

Combined with winter peaking capacity of 280,000 kilowatts of hydroelectric power from the Western Area Power Administration, Basin Electric has a regional power supply capacity of over one million kilowatts.

The growth of Basin Electric and its member systems has paralleled a period when the Missouri River Basin region has moved from an era of hardship and limited promise to one of social advancement and greater economic opportunity for its citizens.

The region has in recent years experienced rapid economic expansion due to increased and mechanized agricultural production and the development of industrial plants to process this production. There is also significant new growth resulting from increased oil production and coal mining for conversion to electric power and synthetic fuels.

As agricultural, industrial and commercial activity has increased and the region's population has stabilized, so has the use of electric power consumers of rural electric systems served by Basin Electric increased. This rate of growth, while lower than it was a few years ago, has been and continues to be greater than the national average and, according to projections, will remain so for at least the next 10 years.

Basin Electric is presently responsible for managing the planning, design and construction of 2.3 million kilowatts of additional generating capacity and will have the operating responsibility for about 3.3 million kilowatts of capacity and more than 1100 miles of high voltage transmission line by the mid-1980s.

Additional facilities include the three-unit, 1,500,000 kilowatt Missouri Basin Power Project's (MBPP) Laramie River Station under construction in Wyoming; the two-unit 880,000 kilowatt Antelope Valley Station under construction in North

Dakota; and, the 100,000 kilowatt Saskatchewan Intertie currently in design and right-of-way acquisition stages.

The Cooperative is the project manager for and holds a 42 percent share in the Laramie River Station. The MBPP is a consortium of six consumer-owned power suppliers including Basin Electric; the Wyoming Municipal Power Agency; Tri-State Generation and Transmission Cooperative of Colorado; Heartland Consumers Power District of South Dakota; the Western Minnesota Municipal Power Agency, representing municipal electric systems in Minnesota, Iowa and South Dakota; and, the Lincoln Electric System of Lincoln, NE.

The Saskatchewan Intertie is a transmission arrangement between Basin Electric and the Saskatchewan Power Corporation for the exchange of 100,000 kilowatts of electric power on a seasonal basis for peaking purposes beginning in 1982.

Basin Electric and its member systems were organized by rural consumers to provide themselves with an essential service . . . electricity. While this remains the basic purpose of the cooperative power supply organizations, they have also been assigned the associated responsibility of fulfilling this purpose in a socially acceptable manner; to protect and enhance the environment and the society in which their consumers live and to provide for the wise use and conservation of the region's energy and natural resources.

In doing so, these systems have followed the advice and philosophy of Leland Olds, a former chairman of the Federal Power Commission and champion of public power, who devoted much of his life to keeping down the cost of power to the ultimate consumer . . . the "man at the end of the line".

The economics of large-scale power supply operations as outlined by Olds back in 1959 has not only been successful in keeping power costs down in the Missouri River Basin region, thereby saving rural consumers millions of dollars, but has also been successful in achieving the development of a regional power supply system that provides the greatest utilization of all resources, including that most important resource . . . those who live and work in the region.

BASIN ELECTRIC: A UNIQUE MEMBERSHIP STRUCTURE

It is important to understand the unique structure of Basin Electric Power Cooperative as a regional generation and transmission cooperative in order to appreciate its organizational parameters in promoting energy conservation.

Rural electrification is more than simply providing electricity to rural areas. It is a mutual process of participation by those who are the consumer-owners of the cooperatives. Because rural consumers control and direct the affairs of their electric cooperatives, rural electrification is a program of social as well as economic significance. It is a civic experience not as familiar to urban residents who clamor for "citizen input" into utility decisions.

The rural electrification program has been a creative instrument in the hands of rural people to develop and nourish their own local areas. While all rural electric cooperatives play an important role in improving and maintaining the quality of rural life in the Missouri River Basin, the primary function of Basin Electric as a cooperative is the generation and transmission of electric power for those systems.

As a cooperative, Basin Electric has no separate class of stockholders. Membership in the Cooperative is evidenced by a membership certificate and consists of the four classifications:

a. Class 'A' Membership. Any rural electric cooperative or cooperative association may become a Class 'A' member and contract to purchase electric service from the Cooperative to the extent that electric service is available and is needed to meet electric requirements in excess of existing generation capacities or contracts for the purchase of electric service.

b. Class 'B' Membership. Any municipality, government agency or cooperative may become a Class 'B' member and may contract for such electric service as the Cooperative may have available for sale and which is not necessary for the requirements of Class 'A' members.

c. Class 'C' Membership. Any cooperative which is a member of a cooperative association holding a Class 'A' membership in Basin Electric and contracts for a portion of its electric power and/or energy from said Class 'A' member, may become a Class 'C' member.

d. Class 'D' Membership. Any person, corporation, partnership, association or other entity doing business within the geographical area served by the Cooperative and which is not eligible for any other membership in the Cooperative.

Each member holding any class of membership is eligible to vote at any annual or special meeting of the membership of the Cooperative. Each member is entitled to only one vote except that a member holding a Class 'B' membership is not entitled to vote unless it has during the year received some type of electric service from the

Cooperative; and, a member holding a Class 'B' membership is not entitled to vote unless it has during the preceding one-year period purchased not less than five hundred thousand megawatt hours of electrical energy generated by the Cooperative. The vote of each member of the Cooperative may be cast only by its duly authorized representative (no proxy). No member may hold more than one membership in the Cooperative and membership is not transferable.

The business and policy affairs of Basin Electric are directed by a nine member Board of Directors. Eight of the directors are chosen from geographic districts representing the cooperative associations holding Class 'A' membership in the Cooperative. The directors serve for a period of two years and can be re-elected for as long as they are directors of the Class 'A' member. The director representing District 9, a district composed of distribution systems unaffiliated with any cooperative association (Federation), must be a director of a District 9 member system.

No district, except District 9, is entitled to a director on the Board of Directors of the Cooperative unless that district includes an operating federated cooperative composed of no less than three member distribution cooperatives and must provide to its members the following minimum services:

- a. Full time staff service.
- b. Central billing under contract to furnish bulk electric service to its members.
- c. Subtransmission facility planning for delivery of bulk electric service.
- d. Meetings of its Board of Directors at least quarterly.

Basin Electric's three-tiered relationship with many of its member systems does, therefore, constitute certain parameters and limitations in any program of energy conservation.

The Cooperative is an extension of its member distribution systems as well as its Class 'A' generation and transmission cooperatives. As such, the needs as well as the desires of those members systems are expressed and mirrored through its Board of Directors which is comprised of elected representatives of the member systems.

Each of the member systems in the Cooperative's eight-state service area have substantially varying needs and capabilities. These systems, each with a different Board of Directors, management and staff, understandably approach situations differently and employ different methods of implementation, such as with the promotion of energy conservation.

For example, one of Basin Electric's member systems is Grand Electric, headquartered at Bison, SD. Grand Electric serves all or part of five counties in northwestern South Dakota and part of one county in southeastern Montana.

This one cooperative service area covers approximately 10,000 square miles . . . an area almost as large as the three states of New Jersey, Delaware and Rhode Island combined (11,000 square miles).

But while these three states have a combined population of almost nine million, the service area of Grand Electric has a total population of about 6000.

With a membership of 1885, total meters of 3626 and 3458 miles of line, Grand Electric has a density of only 1.05 consumers per mile of line.

The consumers include a Minuteman missile complex and some 80 oil wells. At the other end of the spectrum is Sioux Valley Empire Electric, a member system of Basin Electric located in eastern South Dakota.

The Sioux Valley service area covers just over 2400 square miles and contains a population of approximately 40,000. The cooperative serves 10,849 members, 12,050 meters and operates 3880 miles of line. These figures give Sioux Valley a density of just over three consumers per mile of line.

Basin Electric, which has long-term wholesale power supply contracts with these systems, is primarily responsible for generating and transmitting their required power supply. The Cooperative's role in encouraging, promoting, developing and enhancing energy conservation among its member systems is, due to the organizational structure, often that of a catalyst, educator and researcher.

BASIN ELECTRIC: ITS ROLE IN ENERGY CONSERVATION

Early in 1978, the Board of Directors of Basin Electric addressed the need for a comprehensive energy conservation program and passed a resolution titled "Conservation of Energy and Load Management". (Exhibit 6) This resolution defined the problem of producing electrical energy, offered a number of alternatives, indicated the areas of possible action, and urged the member systems of Basin Electric to adopt sound policies for conserving energy and coordinating load management. The resolution led to the establishment of an alternate energy sources and conservation program for the Cooperative.

On May 11, 1978, the Basin Electric Board of Directors established an Alternate Energy Sources and Conservation Program Advisory Committee. Class 'C' and Class

'A' distribution member managers, one from each of the Cooperative's nine membership districts, were selected to the committee.

The basic purpose of the committee was to develop a positive program to encourage conservation and to look at alternate forms of energy that could benefit rural consumers served by Basin Electric and its member systems throughout the region. The Committee was requested to advise Basin Electric management on the types of programs which could be most beneficial in helping consumers minimize their electric bills and lessen the need to build additional and costly power supply facilities.

ENERGY AUDIT TRAINING PROGRAM

Because of the rural nature of the Missouri River Basin region, a sector that required immediate attention for energy conservation was residential dwellings and small commercial buildings.

The Advisory Committee chose home construction and energy use as its primary area of concern. An Energy Auditor Technician Training Course was subsequently developed.

The following objectives were adopted for the course:

1. Train auditors within the Basin Electric member system service areas to provide residential audits for rural electric consumers in compliance with the Rural Electrification Act and state and national policy. (Exhibit 7)
2. Each auditor be exposed to rural electric history, operation and rates and rural electric programs in order to better inform the consumer about energy savings.
3. Each auditor be trained in home construction, equipment and material to reduce energy consumption as part of a peak saving program.

The National Rural Electric Cooperative Association (NRECA), Washington, D.C., was also developing an energy auditor training course in 1978. Upon the recommendation of the Basin Electric Management Advisory Committee and area statewide associations of rural electric cooperatives, the Energy Advisory Committee directed Basin Electric staff to investigate the applicability of utilizing the NRECA program in a comprehensive regionalized training program. The program that was ultimately developed is a combined effort of NRECA, several statewide rural electric associations in the region and Basin Electric.

The statewide associations have sponsored and promoted six auditor training sessions in the states of Montana, Iowa and North and South Dakota. Because of the efforts of the statewide organizations, over 190 rural electric personnel have been trained on energy audits and they represent each of the Basin Electric distribution cooperative members in those four states.

The statewide associations recognized the program as an opportunity to demonstrate that rural electrics are concerned about the energy future and are taking positive steps to reduce the need for consumption of vital natural resources.

Basin Electric provides the last one and a half days of auditor training at each session, building on the subject matter initially provided by NRECA. Specifically, the areas covered by Basin Electric are:

1. How to conduct an audit at the consumer's home.
2. How to develop an energy conservation program within the cooperative.
3. Using tools of the trade for conducting audits.
4. Information and consumer motivation.
5. Solar energy potential.
6. Wood burning stoves and fireplaces.
7. Infrared thermography.

Other areas discussed include micro and macro economics of energy conservation, self-help conservation programs, energy conservation newsletters, product sample cards, and special window treatment for increasing the insulation value on windows and sliding glass doors.

Self-help in energy conservation has become a major theme in promoting and encouraging home owners to look at their own home and determine what areas need repair, weatherizing or insulating.

A series of self-help slide shows have been developed for the distribution cooperatives to use in addressing consumers at annual membership meetings or other informational meetings.

Basin Electric has also developed an energy conservation slide calculator to be used by the auditor in determining fuel savings, dollar savings, and installation cost of recommended retrofit measures. The calculator provides this information in twelve different areas of energy conservation in the home:

1. How does your heating bill compare;
2. Attic insulation;
3. Wall insulation;
4. Floor insulation over unheated space;

5. Basement wall insulation;
6. Caulking;
7. Weatherstripping;
8. Window glazing;
9. Thermostat setback;
10. Furnace improvements;
11. Duct insulation;
12. Water savings.

An energy conservation newsletter for auditors is to be published and distributed by the statewide associations providing information about energy conservation and retrofit. Upon request, Basin Electric staff work with the statewide associations in coordinating the content of the newsletter.

A direct telephone communication has been established between the member system auditors and Basin Electric staff whenever special problems occur in completing an audit.

Local rural electric cooperatives, the statewide associations and Basin Electric have appeared on television and radio and have been reported on in newspapers and magazines throughout the region in reference to their energy conservation efforts.

Basin Electric's efforts in energy conservation have been guided by the Energy Advisory Committee. In addition to the advice of this committee, Basin Electric staff and management hold monthly meetings to discuss current issues and problems that develop. Basin Electric management involved are the department heads of Planning and Marketing, Community Development and Legislation, Information, and the General Manager.

The Energy Advisory Committee, in addition to the auditor training program, has provided a two-way informational exchange between the member rural electric cooperatives and Basin Electric. The committee meets four to five times each year and discusses a wide range of subjects including:

Solar heating—Basin Electric has published and distributed a booklet titled "Energy from the Sun". It includes information on solar domestic water heating systems, their operation and performance.

Wind turbine generation—A number of publications have been made available to the committee concerning the design, siting criteria and application of small-scale WTG systems. The committee has recommended Basin Electric initiate studies to analyze the application and economics of wind turbine systems.

Irrigation peak demand reduction—The efforts of the western Nebraska rural electric cooperatives in load management on irrigation loads has been studied and discussed in detail.

Small-scale hydroelectric conversion facilities—These were analyzed by the committee but because of limited site potential, certain economic, environmental, and legal constraints, the committee has made no recommendations in this area. Member systems are, however, individually pursuing this alternative in areas where such potential may exist.

The concept of "self-help" is offered to Basin Electric employees on a monthly basis and involves three hours of classroom training on what to look for in a house, materials and methods to correct any problems found and an audit of employees' homes with other employees observing.

ENERGY CONSERVATION, COGENERATION, AND ALTERNATE ENERGY PROJECTS SPONSORED BY AND/OR INVOLVING BASIN ELECTRIC

A. Headquarters building design and active solar collection system

Basin Electric's headquarters building, completed in 1975, is designed to achieve maximum energy efficiency. Three of the building's four floors are built into the east side of a hill to escape prevailing northwest winter winds. The building is heavily insulated to minimize heat loss and gain. (Exhibit 8)

The windows face southeast to gain maximum exposure to the sun during the winter months. The heating system provides for the utilization of passive solar energy, body and mechanical heat and lighting heat and accomplishes maximum energy conservation through energy reclaim and storage techniques.

In 1977 the Department of Energy (DOE) selected headquarters building for a five-year solar heating demonstration project to help determine the feasibility of solar heating for commercial buildings. Construction on the solar demonstration project began in October, 1977 and was completed in October of 1978.

The cost of the solar heating system was approximately \$430,000 with DOE providing 90 percent of the funds and Basin Electric 10 percent. The supplemental heating system is owned and operated by Basin Electric and DOE monitors the system's performance to determine feasibility and cost-benefit ratios. Weather data and information on the operation of the solar system is gathered by a computer

console at the headquarters and transmitted daily to a central computer bank in Huntsville, AL for evaluation by DOE. The solar system was designed to provide approximately one-third of the heating requirements of the headquarters building on a supplemental basis.

Results from the first partial-year of operations, consisting of an 81-day period from December 12, 1978 through April 2, 1979 showed that the solar panels collected approximately 167 million Btu of heat energy. The equivalent electrical energy which did not need to be purchased during this period amounted to 48,931 kilowatt hours (KWH). At a 1979 rate of 3.5¢ per KWH, the dollar value of energy not purchased was estimated at \$1,713. Assuming a six month heating season (180 days) and the same solar collection rate, the electric energy saved may be estimated in value at \$3,807.

Across the winter season (October through March) of 1979/80, the total heating requirements and sources for the demonstration systems are summarized as follows:

ACTUAL EXPERIENCE—KWH BASIN

	Solar panels	Auxiliary electric boiler	Building waste or stored heat	Total heating requirements
October 1979.....	20,700	0	18,100	38,800
November 1979.....	14,400	1,600	103,300	119,300
December 1979.....	16,900	10,900	102,800	130,600
January 1980.....	17,500	35,000	128,000	180,500
February 1980.....	16,700	27,100	103,900	147,700
March 1980.....	26,800	10,000	90,100	126,900
Total kWH.....	113,000	84,600	546,200	743,800
Total percent.....	15.0	11.0	74.0	100.0

The panels supplied 15 percent of the actual heating requirements for the 1979/80 winter season. At a rate of 4¢KWH, the total savings amount to \$4,520.

Compared to the installed cost of over \$400,000 the estimated savings appear very small. However, the purpose of the system is to gain actual experience with solar energy on a large scale and the program was not designed with economics as the primary factor.

B. Solar construction wash house facility

Basin Electric and participants in the Coyote Power Project, an investor-owned power generation project located near the Cooperative's Antelope Valley Station (AVS) Project, are using the sun's energy for heating water in a solar wash house. The wash house is in the Prairie Hills housing subdivision of Beulah, ND. The subdivision is part of an industry impact alleviation plan for housing construction workers employed at various power projects in the areas, and their families.

The wash house solar system uses 800 square feet of collector panels to heat approximately 1800 gallons of water for use in showers and to provide heat for the 70' by 26' building.

As an energy efficiency measure, the showers are coupled to three-minute timers which provide construction workers with a comfortable mix of water at 90 degrees. The workers are not, however, limited to a three-minute shower.

Auxiliary heat for the building is provided through heat-strips in the walls and floors. This type of radiant heat is a relatively new concept and is activated in the event the sun doesn't shine for three days or longer.

Monitoring equipment installed on the wash house facility showed that in 1979 for the months of May, June and July, 5844 KWH was saved. Based on a 1979 retail rate of 3¢ per KWH, this amounted to a savings of about \$175 for energy not purchased. The cost of providing the solar installation to the wash house was approximately \$70,000.

The Prairie Hills housing subdivision complex is home to about 500 workers involved in the construction of power plants in Mercer County, ND. Located within the Beulah city limits, the \$4 million complex was jointly developed by Basin Electric and the Coyote Station project participants. Prairie Hills is designed to be converted to permanent single family dwellings when development activity moves out of the construction phase and the power plants are put into commercial operation.

This unique land development plan allows for an orderly transition in the economic life of the local community. It is similar to a housing plan developed by Basin

Electric as part of a socio-economic impact alleviation program being conducted during construction of the Missouri Basin Power Project's (MBPP) Laramie River Station near Wheatland, WY.

C. Load management

Basin Electric and Central Power Electric Cooperative at Minot, ND, a Class "A" member system of Basin Electric, entered into a cost-sharing agreement for a pilot load management study in October 1976. The cost to Basin Electric was approximately \$109,000. Basin Electric purchased 100 two-channel recording units and Central Power bought 100 four-channel devices. Central Power was responsible for installation, maintenance and monitoring of the equipment. In addition, Central Power analyzed the data gathered through the pilot program.

The study covered the two-year period from 1977-79 and was implemented in two phases. The first phase consisted of installation of four-channel magnetic recording meters on various Central Power substations and two-channel magnetic recording devices on a variety of selected electric loads in Central's service area.

The four-channel recording devices measured the time, kilowatt peak, kilovolt ampere reactive peak and the average voltage of electrical loads. The two-channel recorders measured the time and kilowatt peak of each individual load. Both the two and four-channel devices recorded what time of day or night peak loads occurred, the duration of the load period and at what time off-peak hours occurred.

The second phase of the study was analysis of the information gathered by the recorders to determine what type of loads, if any, could be shifted from peak periods to off-peak hours.

Measuring and monitoring loads in this manner helps Central Power and Basin Electric determine what loads, if any, can be regulated in order to make more efficient use of existing generation and transmission facilities. The results of the study are now being published for final study and review.

D. Sunflower hulls as power plant fuel

Basin Electric initiated studies in 1978 to determine if sunflower hulls can be used as boiler fuel for electric generating plants. The research was related to a proposal for supplying steam from Basin Electric's 50,000 kilowatt William J. Neal Station near Velva, ND, for a proposed oil sunflower processing plant to be constructed adjacent to the power plant site. When engineering and design concerns are successfully resolved the exchange of hulls and steam is expected to reduce the operating expenses for both the sunflower processing plant and the Neal Station. (Exhibit 9)

The Economic Development Administration (EDA) awarded Basin Electric \$30,000 to fund half the study costs, and the North Central Sunflower Task Force also helped pay study expenses.

The research into the use of sunflower hulls as a boiler fuel represented another area of pioneering research by the Cooperative. An increasingly popular cash crop in North Dakota and several other Missouri River Basin states, sunflower hulls have a heat value of about 8,200 Btu per pound, according to preliminary tests. By comparison, lignite, the regular fuel for the Neal Station, has a value of about 6,500 Btu per pound.

The proposed sunflower processing plant will have a capacity of 1,500 tons of seed per day and operate about 330 days a year. The plant is to be owned by the Midwest Processing Company (MPC), a group of Minot, ND, area businessmen, with the Pillsbury Company and A. E. Staley Company as partners. The initial cost of the venture, scheduled to become operational in September 1981, was estimated at \$25.3 million, and a FHA guaranteed loan of \$23 million was secured by MPC from a Minot bank.

Assisting with the supporting development of the sunflower plant have been the North Central Sunflower Task Force, a group of Minot-Velva area farmers; the Minot Area Development Corporation, and the Velva Development Corporation.

Basin Electric assessed the potential for utilizing oil sunflower seed hulls as an alternative and renewable fuel supply at the Neal Station. Seventy-five tons of hulls were pulverized and burned during a pilot pulverizing and combustion experiment on August 27-September 31, 1979. Equipment for the experiment was designed and built by Cooperative employees.

Conclusions from the experiment were that hulls can be pulverized and burned in a reduced boiler load with a hull-lignite fuel blend ratio of 10/90 without any major observable fireside effects. The only observable change in normal boiler operation with a 20/80 hull-lignite fuel blend ratio was a 5,000 pound per hour increase in steam flow. No negative effects of excessive ash buildup or deposits were observed in the boiler or electrostatic precipitator after the experiment was concluded.

Basin Electric is presently studying different pulverizing systems and related equipment for potential use in the full-scale and long-term operation for combustion of hulls. Additional research is being conducted to determine if the pulverized hull transport system can be connected to the existing pulverized lignite transport system in an attempt to eliminate modifying the boiler and thereby minimize costs.

Department of Energy staff monitoring the pilot combustion experiment at the Neal Station concluded that utilizing hulls in the amounts tested will not adversely affect boiler performance in terms of ash fouling and particulate collection. Sulfur dioxide monitoring results indicated that there were reduced emissions during the pilot experiment. DOE recommended additional research to determine long-term ESP operational reliability and the accuracy of SO₂ emission measurements.

The William J. Neal Station was the largest lignite-burning electric generating facility in the northern United States when it entered commercial operation in 1952, and as such was a pioneering venture. Since then it has been used for developing flue gas desulfurization technology as well as for producing electricity.

Basin Electric's cooperation with local interests on the sunflower project and the initiative shown by rural electric leaders in the Minot-Velva area have been commended by United States Senator Quentin Burdick of North Dakota and by REA Administrator Robert Feragen.

E. Alcohol fuel study—Laramie River station

Basin Electric made application to the U.S. Department of Energy (DOE) in April of 1980 to fund a feasibility study for a cogeneration grain alcohol plant at the Missouri Basin Power Project's (MBPP) Laramie River Station.

Cogeneration is a concept that links electrical generation with process heat or steam production. Waste heat from industry can be captured to produce electricity, and waste heat from electric utilities can be captured to produce process steam for industry or hot water for heating buildings and other uses.

Basin Electric is proposing to investigate the cogeneration concept of providing a total energy package, i.e., steam, electricity, and cooling water from a large coal-fired generating plant to run a large grain alcohol plant. Alcohol plants of 10, 20 and 50 million gallon capacity per year will be analyzed in this study.

The Laramie River Station, located near Wheatland, WY, consists of three 500,000 kilowatt units burning sub-bituminous Wyoming coal. Each unit produces over four million pounds per hour of steam and cycles 220,000 gallons per minute of cooling water.

The cogeneration concept is ideal in meeting the criteria set forth in Public Law 96-126 to produce an alternative fuel at commercial levels as rapidly as possible.

The key parts of the design portion of the proposed project deal with the cogeneration of steam in a large coal-fired electric power generating facility, and the use of this steam by an adjacent grain alcohol plant to meet all requirements of steam for conversion of feed grains (corn and milo) and possibly sugar beets, into anhydrous fuel grade ethanol by conventional fermentation of the starch and sugars and purification of the grain alcohol by conventional distillation processes.

If an alcohol plant can purchase its steam and cooling water requirements it can save the initial capital investment in a coal-fired boiler plant and cooling tower with its associated water makeup system. Preliminary estimates of the investment and operating cost savings have been made for a 20-million gallon per year anhydrous grain alcohol plant to test the economic viability of the proposed steam cogeneration and cooling water supply system. The capital investment for the alcohol plant would be reduced by \$6 to \$7 million out of a total plant investment of about \$34 million without cogeneration. The operating cost for the plant would be reduced by about three to four cents per gallon of grain alcohol out of a total operating cost of about 45 cents per gallon without the use of cogeneration.

A plant is located at a site which would give access to large amounts of feed grains without incurring excessive transportation charges. The distillers dried grains from the alcohol plants would be shipped to cattle feeding areas such as in western Nebraska and northern Colorado. The fuel grade ethanol, which is in high demand for producing gasohol, would be marketed as close to the plant site as possible.

F. Low-grade heat utilization at the Laramie River station

In March of this year Basin Electric, along with the Platte County (Wyoming) Board of Commissioners and the Old West Regional Commission, sponsored a study on low-grade heat utilization.

The objective of the investigation was to determine if low-grade heat energy from the Laramie River Station in Wyoming had potential commercial use. The Laramie River Station is a coal-fired electrical generating plant consisting of three 500,000

kilowatt units, two of which will be available for utilization of low-grade heat energy.

The study considered the utilization of low-grade heat energy in two major areas of application: aquaculture and horticulture.

Aquaculture in this application means raising fish under controlled circumstances for commercial sale. Low-grade heat energy would be used to control the fish-culture water temperature, substantially reducing fuel and energy costs that would otherwise be required in an aquaculture venture. Data and analyses presented in the report addresses these objectives as they related to catfish and trout aquacultures.

Research shows that almost all commercial trout are grown in Idaho because of the most ideal natural conditions and superior quality of the fish. This presents a formidable competitive disadvantage to trout production at the Laramie River Station. Cost of a semi-raceway aquaculture facility would be \$881,000. A cost analysis further indicates that weather is a disadvantage in that a trout facility could only operate half a year.

While the nation's consumption of domestic, farm-raised catfish is 50 percent more than that of trout, there is limited demand for catfish in the primary market area.

Horticulture, the other area investigated, includes floriculture, potted plant production and greenhouse vegetable production. Low-grade heat energy would be applied to control the growing environment for these products, primarily in greenhouses.

Floriculture, or commercially grown flowers, demonstrates impressive price increases with each year. This situation establishes a favorable environment for a new organization to enter the market, even though a floriculture facility would cost \$1.8 million to build. Roses or carnations would probably be the most profitable flowers to grow year-round.

Potted plant production appears to be another market opportunity. Competitors are generally local, small and fragmented. One proven way to enter this market is by providing bedding plants. The labor intensive nature of this operation might be a serious negative factor. With the increasing level of plant selection in supermarkets for the mass market, as well as a consumer reaction to high grocery prices by planting new or larger gardens, plant demand should continue to grow.

Greenhouse vegetable production within the market area is nominal. Produce from the proposed operation would face little direct competition from other hot-house produce. Prevailing market prices and quality of field-grown vegetables would be the primary determinant of prices charged by the proposed operation. Price premiums of 10 to 25 percent for greenhouse produce above field grown prices are a reasonable expectation.

The greatest potential between aquaculture and horticulture appears to be in horticulture. Aquaculture is the least favorable market opportunity because of limited demand, modest consumer acceptance for catfish, entrenched competitors, high capital investment in specialized facilities and concentration within a narrow market.

Floriculture, on the other hand, experiences several advantages. Assuming competitive prices and quality, the diverse hot-house output of floriculture and produce operations at the Laramie River Station would serve a large and growing market. A well-managed greenhouse operation could meet with favorable opportunities.

G. Fish farm demonstration project at Leland Olds Station

In 1976, Basin Electric entered into an agreement with a local farmer, Harold Erickson from Carrington, ND, whereby Erickson would raise rainbow trout year-round at the Cooperative's 656,000 kilowatt Leland Olds Station near Stanton, ND, using the warmed condenser cooling water discharged from the power plant. (Exhibit 10)

Erickson was and still is a fish farmer in the Carrington area. His operation in Carrington was limited, however, because he could grow fish for only six to seven months a year before his ponds would freeze up. Using the warmed water from the power plant allows for year-round, controlled temperature production.

An initial experimental project was begun in the spring of 1977 using a single stock watering bin as a pond and pumping Missouri River water and power plant condenser cooling water in combination through the pond to maintain a constant 60-degree temperature. As a result of the positive growth rates and weight gains experienced in this experimental project, Basin Electric's Board of Directors authorized and expansion of the project in the fall of 1977, to allow one acre of land on the Leland Olds plant site to be used for the construction of three ponds.

The three ponds were completed and stocked with fingerlings in the summer of 1978. In the first year of operation, approximately 50,000 pounds of marketable fish

were raised in the ponds. On the basis of this success and growth and weight gains experienced by the fish in a year, the Board of Directors approved expansion of the facility to encompass an additional three-acre surface area to include eight additional ponds. Work began on this expansion in the fall of 1979 and is expected to be completed this summer.

The eleven ponds will be capable of producing approximately 125,000 pounds of marketable rainbow trout per year. Water requirements for the facility will be provided by circulating pumps capable of delivering approximately 10,000 gallons of water per minute.

To develop a system which is virtually self-contained, a small-scale hatchery was set up on the site which should hatch our approximately 100,000 eggs this spring. The trout currently experience an inch to an inch and a half growth rate per month under the constructed conditions and are grown to from one to two pounds prior to marketing.

H. Share a ride and save

Basin Electric added four new vans to its employee van pooling program during October, 1979. The program now has a fleet of six vans providing rides to and from work for 72 headquarter's employees. The vans cover areas in north and south Bismarck and Mandan, picking up and delivering riders to their homes. (Exhibit 11)

The van pooling concept was first introduced to Basin Electric in 1976 by the North Dakota State Highway Department. Basin Electric researched the idea, took surveys and checked with employees. Sixteen employees initially expressed an interest in the program and the Cooperative's Board of Directors approved the purchase of a 12-passenger van.

With the operation of that first van in August, 1977 Basin Electric became the first employer in North Dakota to participate in an industrial van pooling demonstration under the state's Energy Conservation Plan. With increased employee interest a second 12-passenger van was added in December of 1978.

All of the vans have been purchased with interest-free loans available through the State Highway Department. Basin Electric funds 10 percent of the purchase price of the van and has four years to repay the Highway Department the remaining 90 percent.

It is estimated that the van pooling operating conserves over 2000 gallons of gasoline per van each year (12,000 gallons total). In addition to energy savings the program removes 66 vehicles from daily city traffic and the Cooperative's parking area.

Van pool participants pay an average fee of \$13 a month for the ride to and from work. This fee covers gas, oil and maintenance expenses for the vehicle. A driver is chosen to operate and maintain each van and to keep expense and performance records. In return for their services, drivers receive a free ride to and from work and personal use of the van for up to 200 miles per month. Each vehicle also has one or two back-up drivers to insure the reliability of the program.

During the workday the vehicles are used by Basin Electric staff for business purposes.

A survey of van pool participants indicates employees appreciate the benefits enjoyed through the program. Some employees estimate they save \$300 or more a year in gas and maintenance expenses by not having to drive their personal vehicles. For some, riding on the van has eliminated the need for a second family vehicle, resulting in a considerable savings. Convenience is a major advantage cited by many.

One member of each van was recently selected to serve on a van pool coordination advisory group. This group meets to handle complaints and solve problems that may arise.

I. Fly ash utilization

A lignite fly ash research program has been carried out by Basin Electric for several years. New uses and methods for the utilization of this by-product of lignite combustion are being tested in North Dakota and elsewhere.

Forty tons of fly ash were originally shipped from the Leland Olds Station to the University of West Virginia at Morgantown in April of 1971. The material was used in research on the use of fly ash in the manufacture of brick.

Research was also undertaken in North Dakota on a paving mix using fly ash as a replacement for asphalt in highway construction. One mile of road near the Leland Olds plant was paved with this substance for testing purposes. The mile took about 974 tons of a mix of 13 percent fly ash, three percent lime and 84 percent aggregate.

Another sizeable North Dakota bituminous highway surfacing project utilizing fly ash from the Leland Olds Station was undertaken in the spring of 1974. A 16.9 mile

stretch of road between Washburn and Underwood in McLean County, ND, was basecoated with a mixture including fly ash.

A lime fly ash treated base was formulated using about 128,000 tons of aggregate, 2,500 tons of hydrated lime and 23,000 tons of fly ash.

Research is being continued by universities and other agencies in several parts of the country on the utilization of fly ash in the production of bricks and concrete.

A \$30,000 grant from the Economic Development Administration (EDA) is funding experiments at the Hebron, ND, Brick Company to test whether fly ash can be used in producing a better, stronger and cheaper fencepost. A mixture of crushed glass, ground-up brick, clay, water and about 30 percent fly ash is used in making the fencepost.

Basin Electric provided approximately 1000 pounds of fly ash from the Leland Olds Station last October for the initial experiments at Hebron.

Tests on the posts, each measuring two and one-half inches thick, six and one-half feet long, and weighing 29 pounds, were conducted by the University of North Dakota's Coal By-Product Utilization Institute. Results from the flexural, shear and compressive strength tests indicated the fly ash fenceposts surpassed brick, portland cement concrete and wood products in all three tests.

The Leland Olds Station alone produces a combined total of 191,000 tons of fly ash and bottom ash each year. Approximately six percent of this is marketed annually and the remainder is buried in disposal ponds on the plant site.

J. Gasification/Electric generation joint facility

Basin Electric and American Natural Gas Company (ANG), a subsidiary of American Natural Resources (ANR), Detroit, MI, developed plans in 1975 to construct facilities on a common site and to utilize common facilities and resources in order to gain construction and operating efficiencies, conserve natural resources and save money for both electric and gas consumers.

The agreement between the utilities called for a joint construction site near Beulah in Mercer County, ND. The project would share lignite coal reserves, common water intake, waste handling, coal handling and rail transportation facilities.

The Cooperative would provide steam and electricity to the gasification plant and would use coal fires, a gasification process waste product, to meet approximately one-half of its fuel requirements for the generation of electricity.

The Antelope Valley Station, a two-unit, 880,000 kilowatt electric generating facility, is under construction by Basin Electric and the first unit is scheduled to be in commercial operation by 1982.

Construction on the gasification facility has been delayed several times. It is currently being delayed by litigation over a Federal Energy Regulatory Commission (FERC) decision concerning gas rates which would take into account the cost of facility construction.

Four additional gas suppliers have joined with ANG to form a consortium called the Great Plains Gasification Project. Project participants are hopeful construction can get underway yet this year.

K. Membership involvement in promoting energy conservation

During 1979, more than 58,000 rural electric consumer-owners of Basin Electric member systems, attended annual membership meetings of those systems. In the course of those meetings, they reviewed operations of the respective cooperatives and adopted resolutions to guide their boards of directors in formulating policies to be implemented by the cooperatives' management and staff.

Duly-elected representatives of those cooperative systems, while participating in the Basin Electric Annual Meeting, in turn adopted resolutions promoting and endorsing energy conservation through such cooperative goals as:

- a. Resource and energy conservation through joint planning (Statement of Objectives). (Exhibit 2)
- b. Power pooling (Continuing Resolution 7). (Exhibit 12)
- c. Regional Interties and National Power Grid (Current Resolution B-2). (Exhibit 13)
- d. Additional hydroelectric generating capacity at Fort Peck and Garrison Dams (Current Resolution B-3). (Exhibit 14)
- e. Hydroelectric Pumped Storage Facilities (Current Resolution B-8). (Exhibit 15)
- f. Alternate Energy Sources (Current Resolution B-5). (Exhibit 16)
- g. Joint Participation in Future Power Supply Projects (Current Resolution B-8). (Exhibit 15)
- h. Conservation of Energy and Load Management (Current Resolution D-5). (Exhibit 17)

The wide range of conservation goals and objectives endorsed by the membership of Basin Electric gives credence to the involvement of the Cooperative at all levels of membership as well as in every area of cooperative activity.

CONCLUSION

Basin Electric has responded to its membership's strongly expressed interest in promoting the many aspects of energy conservation by engaging in energy conservation informational exercises and programs, auditor training programs, joint power planning and participation in such projects, ultimate power plant production efficiencies, alternate energy studies and experimental projects, load management and employee van pool projects. In the construction of power plants, the Cooperative has incorporated designs so the plants could be utilized for cogeneration and waste heat utilization if the economies of various proposed projects proved viable.

All areas of energy conservation are given careful scrutiny to determine, before project implementation, the complex economies involved. The productivity of the farmer-rancher members of the member systems of Basin Electric, including their ability to provide food and fiber for the nation and for export, is currently under serious strain from high interest rates, low farm prices and high operational costs without undue exacerbation caused by the Cooperative's unwise involvement in energy conservation projects of questionable value.

In the final analysis, the Cooperative is approaching energy conservation in many areas with the endorsement, involvement and support of its membership. Conservation through cooperation has proven to be a unique and effective program since the very beginnings of the rural electric movement and it continues to make steady and efficient progress in energy conservation.

Many additional areas of future efforts in energy conservation have been discussed and several are being pursued by Basin Electric. Efforts proposed by Basin Electric staff for 1980 included the following:

1. Farm Site Energy Audits.—The agricultural colleges of North and South Dakota have expressed an interest in conducting a regional training session on energy conservation/management on the farm site. Topics include crop processing, livestock housing, the farm shop and transportation.
2. Commercial Audits.—Each membership district of Basin Electric is being encouraged to have on staff an auditor to work with the cooperatives in that district in performing commercial audits.
3. Mobile Home Audits.—The Energy Advisory Committee has recommended that a fact sheet for energy conservation in mobile homes be developed for distribution to the member cooperatives.
4. Information Distribution.—Basin Electric will continue working with statewide rural electric associations in the distribution of information relative to energy conservation.

STATEMENT OF REX CARPENTER, NEBRASKA RURAL ELECTRIC ASSOCIATION, LINCOLN, NEBR.

Mr. Chairman and members of the Subcommittee, my name is Rex Carpenter. I am General Manager of the Nebraska Rural Electric Association (NREA). NREA is a service organization representing 33 rural public power districts and rural electric cooperatives. These rural electric distribution systems serve more than 115,000 consumers in the State of Nebraska.

I want to thank Senator Zorinsky and the members of the Subcommittee for this opportunity to discuss what we see to be the implications of energy conservation and management programs for Nebraska's rural electric systems and their consumers.

First, I would like to say that the Nebraska delegates to the 38th annual meeting of the National Rural Electric Cooperative Association at New Orleans in March unanimously supported and endorse the resolutions adopted there which call for extensive energy conservation and management programs. These resolutions, I'm sure, have been made available to you, or will be, by NRECA.

Secondly, I would like to briefly outline some of the efforts and programs to conserve energy and to encourage and support its more efficient use which we have implemented or which we support in Nebraska:

NREA-supported legislation which was enacted only last month by our state legislature which provides for loan funds for energy conservation improvements to homes through the Nebraska Mortgage Finance Fund. The legislation also provides incentives for the installation of alternative energy devices.

The association publishes a monthly magazine for the consumers of our member-systems. Twenty percent of its content is dedicated to articles and information about energy conservation, energy management, and alternative energy sources.

The Nebraska Rural Electric Association has conducted or sponsored training programs for employees of the state's rural electric systems. These employees have been taught how to conduct home energy audits and to counsel consumers in the management and conservation of energy. Many of the systems have invested large sums of money in sophisticated equipment to aid them in conducting these home energy audits.

Late this summer we will sponsor a week-long "Energy Conservation Camp" for 60 to 100 Nebraska high school juniors and seniors. There they will have an opportunity to learn what they can do to conserve energy or to use it more efficiently at home and on the farm and ranch. They will be encouraged to promote energy conservation and efficiency in their communities upon their return.

Many of the efforts to encourage energy conservation which I have outlined are similar to programs which now exist almost everywhere in the nation where there is a rural electric system.

Let me now describe a conservation program, or more specifically, a load management program, which I believe is unique to the State of Nebraska—at least unique in its extent, or scope. However, I also believe that the implications have national significance.

I am referring to the efforts of Nebraska's rural electric systems to control their consumers' huge summertime demand for electrical energy, a demand created largely, without question, by the need to irrigate much of Nebraska's crop land.

Although called a load management program, these efforts to reduce or control demand are indeed a conservation program because they are designed to conserve generating capacity. The more efficient use of our generating and transmission facilities may not necessarily mean that less energy will be used, but it does mean that we can at least defer the need to build additional generating and transmission facilities at today's tremendously high costs.

To appreciate the magnitude of these efforts, let me point out that more than five-million acres of Nebraska cropland are irrigated. Only California and Texas have more irrigated acres. But measured against the total number of acres farmed in each of the three states, Nebraska certainly ranks first in the proportion of its farm land which is irrigated. And, as opposed to gravity-flow irrigation systems common to California and Texas, in Nebraska about 80 percent of the water used for irrigation is pumped from on-site wells through center-pivot or pipe irrigation systems.

Nebraska's rural electric supply electrical power to almost 21,000 of these wells and irrigation systems, which have a connected load totaling more than 775,000 horsepower. This number of horsepower is equal to 581 Megawatts of demand. The irrigation load served by the rural electric systems equals 30 percent of the state's irrigation systems. The remainder are powered by diesel fuel (36 percent), natural gas (21 percent), or propane (12 percent).

Last year, during a few short weeks in the middle of the summer, Nebraska farmers purchased from the rural electric systems a total of 417-million kilowatt-hours of electricity for their irrigation systems. These 417-million kilowatt-hours represented slightly more than 17 percent of the total number of kilowatt-hours sold by the rural electric during all of 1979. In the case of Midwest Electric Membership Corporation, a cooperative headquartered at Grant, Nebraska, the number of kilowatt-hours consumed by irrigation systems represented almost half (49.3 percent) of its total kilowatt-hour sales.

In any case, because of the electricity used for irrigation is consumed within a very short period of time during the summer irrigation season, the result is a summer peak demand (of generating and transmission capacity) of almost staggering proportions when compared to the same systems' wintertime peak. (Electric heat, which might represent an off-setting wintertime load, is used by less than five percent of Nebraska's homeowners.)

Although it varied from system to system, the summer peak for the average rural electric system in Nebraska was slightly more than 60 percent higher than the average winter peak.

Because the difference between the summer peak and winter peak is so great, the rural electric distribution systems' wholesale power suppliers impose a ratchet charge, or a penalty, in effect, in their wholesale rates. This ratchet charge is designed to cover part of the costs of having generating and transmission facilities, or capacity, available to meet the summertime peak demand even though the capacity may be unneeded during the winter months. Or, on the other hand, the ratchet charge may cover the costs of operating peaking plants, plants which use

more expensive fuels. In 1979, 26 of Nebraska's rural electric systems paid a total of \$3 million in ratchet penalty charges. These charges were in addition to the demand and energy charges incurred for power actually purchased and consumed.

However, and this is my point, the peak reached last summer and the ratchet charges paid in 1979 were much lower than they would have been because of the load management programs implemented by Nebraska's rural electric systems. And, because of these load management programs, the need for generating and transmission facilities was less than it otherwise would have been.

The rural electric systems of Nebraska began an extensive program to control the peak created by their irrigation loads several years ago—even before conservation was the popular theme that it is today. Today, 40 percent of the irrigation horsepower served by the rural electric systems are under some form of load management. The number is increasing, too. This summer more irrigation load will be controlled and two of the systems will begin controlling air conditioning and water heating loads as well.

A variety of load management systems are used by the different Nebraska rural electric systems, each designed to fit their own local situations and system characteristics. Some use time clocks to shut off the irrigation systems at critical times. Some are controlled remotely by radio signals or a ripple system which sends a signal through the electric line itself. Another system uses a temperature control which shuts the irrigation system off when the temperature reaches 95 degrees and keeps it off until the temperature drops to 80 degrees. Others use voluntary systems where the irrigators agree not to use their irrigation systems during certain hours during the day or certain days of the week. All the load management programs are designed to hold the peak demand at the lowest possible level.

In addition to the load controls and scheduling designed to reduce the creation of higher peaks, the rural electric systems also are helping their irrigators test their irrigation pumps for efficiency and getting them up to standard. Also working in cooperation with the local Cooperative Extension Service offices, meetings for the irrigators are scheduled to show them how they can use less water and, consequently, less electricity or fuel, for irrigating their crops.

After reviewing what the rural electric systems are doing to conserve and manage the use of electrical energy in Nebraska, I believe they can take pride in their efforts. And, I can assure you, that these efforts will be continued and expanded in the future.

A survey conducted early this year indicates the rural electric systems in Nebraska will spend more than \$565,000 on energy conservation efforts in 1980.

Over the past few years, especially since the Arab oil embargo of 1973-74, the rural electric systems in Nebraska—and elsewhere in the nation—have been increasing at an accelerating rate the allocation of manpower, dollars, and other resources to energy conservation and management programs.

It is difficult to assess the results of these efforts with any real certainty. The level of consumption of electricity is subject to so many variables. Local economic activity, variations in the weather (especially rainfall in our area), conversions from other fuel sources, community growth rates, rate increases, and other factors influence the use of electricity. But we are convinced that our efforts to encourage and support energy conservation has had a positive effect. For the five-year period from 1970 through 1974, our consumers increased their consumption by 30 percent. But for the five-year period from 1975 through 1979, consumption increased only 15 percent. In 1979, total consumption of kilowatt-hours actually declined from the total number of kilowatt-hours consumed in 1978 by consumers of the 24 systems in central and eastern Nebraska.

Finally, let me discuss some of the implications of these conservation efforts and some of the concerns that we have in Nebraska.

There is indeed the very real possibility that extensive conservation may actually force rates to be increased. If home weatherization and other wintertime conservation efforts reduce the wintertime peak in our state and yet the summertime peak continues to move upward, there is no question that rates paid by irrigators, at least, would have to be increased.

We know that our summer peak will continue to go up even as we expand our load management programs. Two-thirds of the irrigators currently use petroleum-based fuels for powering their pumps. But they are beginning to convert to electric power in increasing numbers for several very good, common-sense reasons: the price of diesel fuel continues to go up; it is realized that diesel fuels, in any case, should be reserved for mobile field work; gas can better be better used for the production of fertilizers; and it makes more sense to use electricity generated from hydroelectric, coal-fired, and nuclear facilities for these irrigation systems than it does to depend

upon petroleum-based fuels which can be better used elsewhere and its supply which is largely dependent upon foreign imports.

Increasing the rates to irrigators would be especially unfortunate in our state. Agriculture is the fundamental economic activity of Nebraska. And, irrigation is critically important to Nebraska agriculture. It is the key to our state's agricultural productivity. This productivity, as you know, also has national significance. Not only in terms of our nation's domestic food supply but also in terms of our balance of trade.

The farmers of Nebraska are willing to bear their share of the burden when it comes to meeting our national priorities. And, the farmers of Nebraska understand that a price has to be paid to encourage conservation. But energy conservation must be kept in perspective and must not be allowed to overwhelm energy efficiency and the shift from foreign oil imports to our domestic energy sources. And, we must not let the burden crush one of the nation's most productive people, the farmer.

STATEMENT OF DAVID OSTENDORF, ENERGY PROJECT DIRECTOR, RURAL AMERICA

Mr. Chairman and members of the Committee, my name is David Ostendorf and I am Energy Project Director of Rural America, a national membership organization that works with and provides assistance to local rural groups throughout the nation on issues related to housing, health care, energy, land and other rural matters.

I wish to thank you for inviting Rural America to present testimony on energy conservation and weatherization in rural areas, with particular focus on the efforts of the Rural Electrification Administration. Our members have long believed that energy conservation, including home weatherization, is the cornerstone of sound energy policy and is of vital importance to the low-income people or rural areas who are our organization's principal concern. As well, our organization has been a long-standing supporter of the principle of consumer-owned, non-profit energy cooperatives.

The data and statistics supporting the need for a massive energy conservation and weatherization program are by now well-established and well-known, and in recent months Rural America has testified before several Senate and House Subcommittees on the matter. But I would reiterate today that the need for strong conservation and weatherization programs in rural areas is great, given that 40 percent of the nation's poor live in non-metro areas and 50 percent of the nation's substandard housing is found in rural America. Of all substandard housing units inhabited by elderly people, over half are in rural areas. And for minorities, the chance of being counted among these groups is significantly increased.

Today I will focus my remarks on the conservation and weatherization programs and efforts of Rural Electrification Administration and its member co-ops. We commend and are heartened by the conservation and weatherization program announced two weeks ago by the REA Administrator—a program that will provide new incentives and low-interest loans for home weatherization and development of renewable sources for electric power generation in rural areas.

The Administrator's decision to exercise his authority under Section 12 of the Rural Electrification Act of 1936 to defer principal payments for distribution systems for re-lending to their members for weatherization is clearly a significant step forward. As well, the Administrator's support of efforts to make REA loans available to finance "study of feasibility of projects, for licensing, and other early costs associated with initiating energy-producing projects" may well help launch REA financed systems into a new era of development of renewable or supplemental sources of energy beyond those of large-scale, centralized, conventional power plants. These steps, along with recently announced downturns in kilowatt-hour sales growth in the REA-financed systems, provide some new signs of hope for rural Americans served by the co-ops.

Still, our organization remains unconvinced that the proverbial corner has been turned in this new drive for conservation and weatherization. In testimony before the Senate Subcommittee on Rural Development last November, we criticized the Farmers Home Administration and the REA for the failures of their weatherization program launched in March of 1977. This volunteer program was expected to weatherize some 4 millions homes, using some \$1 billion in loans to homeowners. But from fiscal year 1977 through fiscal year 1979, only \$946,000 of that money had been tapped to weatherize 1,072 homes. Needless to say, neither Farmers Home nor REA were pleased with the findings we presented in that testimony, particularly after the New York Times ran a story on the matter. Yet, the agencies have not disputed our charges.

Some 53 percent of the REA loans made in 1979 were through Arkansas Power and Light, a privately-owned utility that got in on the action when the program was

expanded to the private utilities. In a recent interview, a representative of that utility attributed the success of the program to extensive promotion and the benefits of significant savings offered to its customers through the program.

In a widely-publicized documentation of REA success in energy conservation and weatherization in 1979, the National Rural Electric Cooperative Association stated in January of this year that 254 systems reported loans totaling more than \$5.5 million. The NRECA did admit that "the bulk of these loans were made by systems in the Tennessee Valley areas, where a TVA-initiated program which includes no-interest loans has been tremendously successful." But the NRECA did not report that this "bulk" of loans in the TVA area comprised \$4.8 of the \$5.5 million—of 87 percent of the total amount loaned. The rest—some half-million dollars for the calendar year—was made in some 562 loans to 223 other non-TVA systems.

The point of this is not to open old wounds, but to emphasize two very clear recommendations that we would make to the Committee regarding the REA conservation and weatherization programs:

1. The programs cannot be and should not be voluntary for the co-ops; and
2. The weatherization loan programs need to be procedurally tightened up and made easily and readily accessible to low- and moderate-income rural people.

I would like to elaborate on these points.

In personal correspondence to the Director of our organization in April of 1976, the Manager of one of the nation's largest Generating and Transmission Cooperatives stated:

"Neither the cooperatives nor any other entity in the energy industry has the ability to enforce the conservation of energy. They can urge it through advertising but, as long as it is left to voluntary efforts, I don't think the results of any such conservation advertising will amount to much."

The manager, I believe, was speaking of the conservation efforts of private citizens and industry. Yet his statement rings true for the co-ops themselves: in short, a voluntary conservation and weatherization program has not and will not work for the co-ops. In spite of the commendable new directions of the REA Administrator, made clear in his recent remarks in New Orleans, the fact is that the conditions under which borrowers will be permitted to begin a program of deferred payments to achieve energy conservation "will not be mandatory." Rather, "it will be an option borrowers can choose to augment their present energy conservation programs under REA guidelines for the use of these funds patterned after the successful programs of the Tennessee Valley Authority."

In the very same speech, the Administrator also said, "I realize the quandary that substantially reduced sales creates for distribution and power systems alike. I can understand the reluctance of managers and directors to undertake major conservation programs when their sales are down sharply." Surely the Administrator could not have missed the irony of his remarks in the context of a highly-touted new push for voluntary energy conservation among those very managers and directors with whom he empathized in an era of ostensibly clashing priorities: energy conservation vs. reduced sales of electricity and the alleged financial pinch of such reductions.

In short, the conservation and weatherization programs of the REA should be made mandatory for every local co-op. REA this year is insuring or guaranteeing nearly \$6 billion in loans to rural electric cooperatives—loans that are used to upgrade distribution systems and expand power generation plants. We believe these loans should not be made unless the borrowers have done everything possible to conserve energy and to adhere to mandatory energy measures and goals for rural home weatherization. There is sufficient precedent for such a requirement within the U.S. Department of Agriculture: one cannot get a loan to buy or build a house with a Farmers Home loan unless certain energy conservation standards for the house are met, including insulation and energy-efficient windows.

If the REA had taken forceful steps to require such conservation efforts among the co-ops from the beginning, including full participation in the USDA weatherization program, more rural homes would be weatherized today. To ignore such a lesson now—and the insights of a co-op manager made four years ago—would be to court further delays in the development of a significant and cost-saving conservation and weatherization program for rural co-op customers throughout the nation.

This brings me to my second point. If the co-ops are to make 5 percent loans available to their customers to finance weatherization, we strongly recommend streamlining of the application procedures, and an aggressive program of promotion. The existing Farmers Home-REA loan procedure for weatherization is simply too cumbersome.

Quoted in the *New Jersey Daily Record* of December 30, 1979, one REA official who chose not to be quoted (for obvious reason) said of the program: "It's an administrative nightmare. Just too many hands. Any student of public administra-

tion could see that." The newspaper reported in that same story that just two loans had been drawn on the program in the entire state, both made through the Sussex Rural Electric Cooperative. The director of the conservation program for that co-op noted "that to qualify for a federal loan a family has to have been turned down for a loan at two other places. Many families, she said, go to a local bank and get a home-improvement loan."

Beyond the procedural requirements for these loans, we feel that the existing interest rates—11 percent—as well as the proposed interest rates—5 percent—are too high for the rural poor who are most in need of assistance to weatherize their homes. The no-interest loan approach of the TVA should indeed provide a model for the entire conservation/weatherization loan program of the REA system. At the very least, no-interest loans should be readily available through the co-ops for those who fall within 125 percent of the federally-established poverty guidelines.

I would close with several observations. There are indeed a number of rural electric co-ops that have made significant and substantial efforts and investments in energy conservation and weatherization programs. Even one of the largest Generating and transmission co-ops—Basin Electric in Bismarck, North Dakota—has a significant energy conservation program that includes a strong energy audit training course and other home energy conservation services. At the same time, however, it continues to expand its generating capacity in the northern plains in order to meet projected load requirements that are being questioned and challenged by numerous co-op members and rancher-farmer organizations in the region. Such a "mixed" commitment is also reflected in the policies of the REA and NRECA: on the one hand, the virtues of energy conservation and the potential for supplemental energy from renewable resources are extolled, while on the other vastly expanded, centralized power projects, including the liquid metal fast breeder reactor are supported. Until the co-ops and the federal government recognize that the commitment of energy conservation is the top priority in the formulation and enactment of domestic energy policy, we will not move any faster than the snail pace of the last seven years toward that elusive goal of energy independence.

The Rural Electrification Administration needs to be encouraged and supported in its efforts to move into a significant and substantial energy conservation and home weatherization program. The REA and Farmers Home Administration should have a substantial staff assigned totally to energy conservation efforts, and extensive training programs for all field personnel in energy conservation. Again the TVA provides a model for such effort, and the REA might do well to work closely with TVA representatives in the days ahead to design and implement a comprehensive energy conservation program to serve the people of rural America—particularly the poor and low-income people who are its customers and its owners, and who have benefitted in the past from its progressive and people-oriented policies and programs. Such programs must now continue in an energy-scarce age where the demand cannot be for more, but for better use and conservation of what we have on line already.

